ELECTRICAL WEST

THE ALL-INDUSTRY MAGAZINE OF PROGRESS

25c a Copy

MAR.
1940

McGraw-Hill Co.
of Calif.

Selling Electric Ranges to the Traveling Public

★ Wherever people go, Edison advertising says, "Compare before you buy—See your electric range dealer," many times daily. In addition to consistent newspaper advertising, over 240 attractive billboards and car cards in 409 public conveyances are building electric range prospects for dealers in Edison territory.

3-40

SOUTHERN CALIFORNIA Edison

ELECTRICAL WEST (with which is consolidated The Journal of Electricity), March, 1940. Vol. 84, No. 3. Published monthly by the McGraw-Hill Company of California, 68 Post Street, San Francisco, Calif. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. Additional entry as second class matter at the post office at Los Angeles. Printed in U. S. A. Subscription rate in U. S. and U. S. possessions, and Canada, $2 per year; all other countries $3 gold (thirteen shillings). Single copy 25c.
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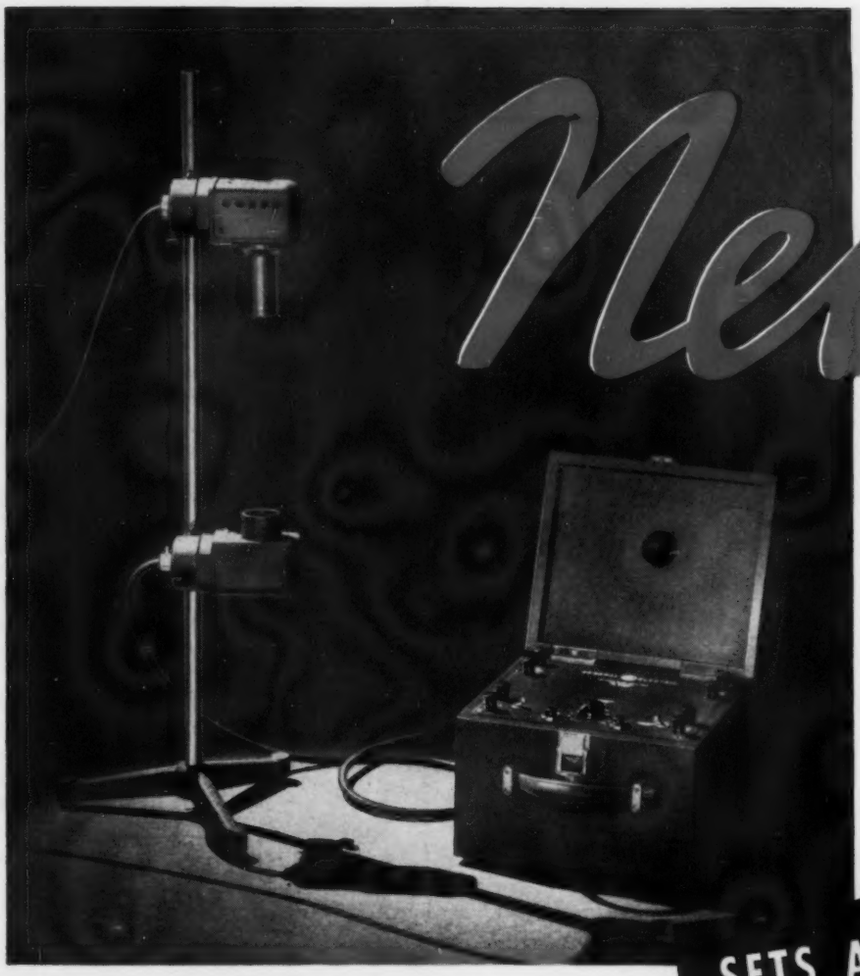


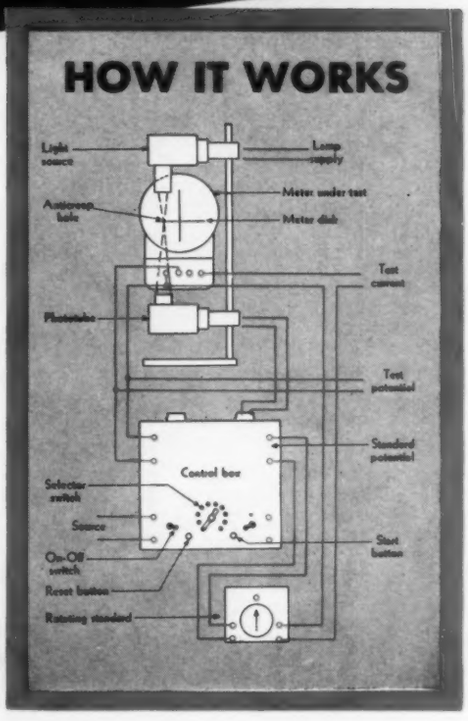
New PHOTOELECTRIC TESTER *for* WATTHOUR METERS

SETS A NEW HIGH IN ACCURACY . . . REDUCES THE COST OF TESTING

THIS new automatic equipment for testing watthour meters makes use of the "electric eye." A light beam and relays count the revolutions of the meter under test, and start and stop the rotating standard. It has two fundamental advantages: *improvement in accuracy* and *reduction in the cost of testing.*

Laboratory tests on this photoelectric equipment show that the timing error is negligible. Hence, long runs are unnecessary. This makes possible a 50% reduction in running time as compared with the running time of the old hand-switch methods, where the timing error is dependent on the operator's skill and efficiency. Repeat runs are, of course, unnecessary.

Such savings in time are important. But larger savings can easily be made by planning the entire test procedure so that the operator performs additional useful work while the photoelectric equipment automatically controls the testing. Suggestions as to how this can be done, how to test meters that do not have anticreep holes in the disk, how the equipment can be put to many other uses—these are explained in Bulletin GEA-3348. Ask for a copy. Or ask the nearest G-E sales office for a demonstration. General Electric, Schenectady, N. Y.



HEADQUARTERS FOR ELECTRICAL MEASUREMENT

GENERAL ELECTRIC

400-40

BETWEEN THIS MONTH'S COVERS

Cinema

SCHOOL FOR STOCKHOLDERS (p. 25): When The Washington Water Power Co. decided to produce a moving picture, telling the "Story of Electric Service," they hired a professional photographer to do it. The result is a splendid dramatization of the utility's background and the work it does to give the Inland Empire outstanding electrical service. Hundreds of stockholders, through this movie, are getting a real insight into the utility in which their money is invested.

Survey

WATER HEATERS-RANGES-REFRIGERATORS (p. 26): A survey conducted by ELECTRICAL WEST asked responsible men in the electrical industry what they thought about the major appliance situation. What of its trends, markets, conditions, problems? What do you think of competition, the utilities' responsibilities, or discounts and allowances? asked ELECTRICAL WEST. The answers to these are given with the identities of the writers kept confidential. Their words are both interesting and enlightening.

Price War?

THIS REFRIGERATOR PRICE WAR — A BOOMERANG OR BOOM? (p. 29): Bill Cyr of ELECTRICAL WEST has been barnstorming throughout the Northwest and Intermountain States, visiting dealers, giving talks before electrical leagues and groups. He's found time to look into a refrigerator price war which has begun in the Western States and presents the opinions of representative dealers and electrical men concerning this condition.

Utility-Dealer Plan

NEW DEALERS BUILD NEW LOADS FOR PORTLAND GENERAL ELECTRIC (p. 30): James A. Polhemus, newly appointed president of Portland General Electric, discusses and outlines the dealer-cooperative plan put into effect by his company. Carefully conceived, organized and followed through upon, the plan is one that has swung merchandising of electric appliances into the hands of dealers, where Portland General Electric wants the business to stay.

Application Data

INDUSTRIAL DATA SHEETS (p. 41): What an industrial or commercial prospect wants to know is how a given kind of electrical equipment is working somewhere elsse in the West. To enable power men to tell them, two electrical associations are collecting data on various pjobs. Beginning in this issue, ELECTRICAL WEST is publishing these sheets for the PCEA and the Northwest Assn. Reported on are: a plant where electric heat speeds the production of wall board; an auto-painting establishment where an electric oven is paying dividends: a machine works where electric heat permits accurate grinding of pistons.

Voltage Regulation

KEEPING VOLTAGE WITHIN BOUNDS (p. 44): Thirteen systems report where they use induction regulators, where step-type, where boosters, and why. Induction units enjoy the preference for lower voltages where high-order regulation is essential, but step-type units are enjoying increasing favor as their prices move into the same brackets as equivalent industion units.

Another Boulder Outlet

THE LINE THAT DOESN'T REST (p. 46): Last year Southern Cal Edison completed its 233-mi. connection to Boulder Dam, immediately put the line to work, packing base load. Since then the line has been operated at a load factor of 97%. There has been one case of trouble, cleared in 30 cycles. Petersen coils make possible the operation of a long, single-circuit line near its steady-state stability limit in this way.

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Cover: "Housewife and small daughter" model in the handsome kitchen of the Southern Colorado Power Co.

Salesman-Contractor

"YOU SELL, I'LL INSTALL" (p. 52): Fellow appliance dealers didn't believe Jack Tennent of Yakima, Wash., when he told them he was selling out his business to help them. Rid of his stock, this enterprising salesman became a service and installation contractor, catering to his old friends. Setting up his tidy, modern shop, he won over their wiring installation business by referring his old customers to these local dealers.

Rural Rewiring

REAL NEED FOR REWIRING ON WESTERN FARMS (p. 56): In an address before the California CREA Rural Electric Short Course class at the Univ. of California at Davis, Hobart Beresford told of the poor wiring conditions in rural homes, and how this situation might be remedied to the general good of the electrical industry. He offers suggestions as to approaches to the various problems that do exist on the average farm in the West.

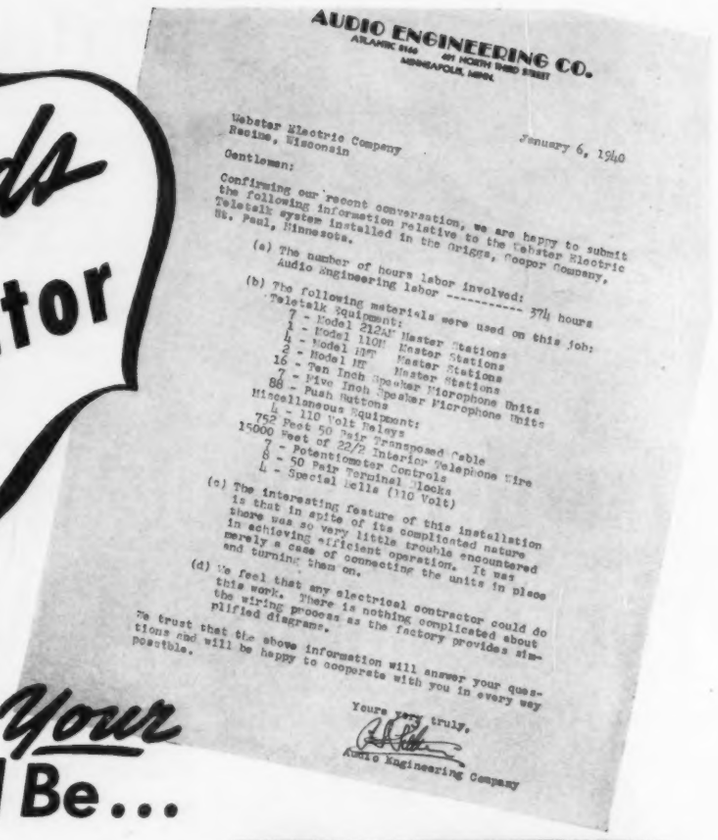
Wholesalers

PREVIEW AT NEWA GATHERING SHOWS 1940 MARKETS (p. 58): A summary of the annual NEWA meeting at Del Monte, Feb. 15-17, entails a discussion of potential markets for 1940 to proposals of a sales campaign to benefit the wholesaler. Attendance at this important get-together of electrical men was the largest in years. F. C. Todt, Los Angeles district manager, was relected chairman of the Pacific Division.

"Somewhere in the West"

NEWS OF THE INDUSTRY (p. 62): New power line from Phoenix to Parker Dam completed . . . Tacoma to tie in with Bonneville late this year . . . City of Seattle extends its power exchange contract with Tacoma City Light . . . Sierra Iron Co. signs second large industrial contract with Bonneville . . . Bonneville to buy West Coast Power Co. lines and cable . . . Eugene (Ore.) decides to build own steam plant, eliminating possible Bonneville tieup . . . Southern California Edison announces $1,000,000 rate reduction . . . Griffith resigns as Portland GE president, and is succeeded by Polhemus . . . Frank Kerr, likewise, retires as active president of The Montana Power Co., with Frank Bird his successor . . . PG and E names Euler new Chief Engineer.

Here's a *Bill of Goods* Any Contractor Can Sell!



AUDIO ENGINEERING CO.
ATLANTIC 9146 491 NORTH THIRD STREET
MINNEAPOLIS, MINN.

January 6, 1940

Webster Electric Company
Racine, Wisconsin

Gentlemen:

Confirming our recent conversation, we are happy to submit the following information relative to the Webster Electric Teletalk system installed in the Griggs, Cooper Company, St. Paul, Minnesota.

(a) The number of hours labor involved:
Audio Engineering labor ---------- 374 hours

(b) The following materials were used on this job:
Teletalk Equipment:
7 - Model 212AM Master Stations
4 - Model 110M Master Stations
2 - Model HM Master Stations
16 - Model MM Master Stations
7 - Ten Inch Speaker Microphone Units
86 - Five Inch Speaker Microphone Units
Miscellaneous Equipment:
4 - Push Buttons
4 - 110 Volt Relays
752 Feet 50 Pair Transposed Cable
15000 Feet of 22/2 Interior Telephone Wire
7 - Potentiometer Controls
8 - 50 Pair Terminal Blocks
4 - Special Bells (110 Volt)

(c) The interesting feature of this installation is that in spite of its complicated nature there was so very little trouble encountered in achieving efficient operation. It was merely a case of connecting the units in place and turning them on.

(d) We feel that any electrical contractor could do this work. There is nothing complicated about the wiring process as the factory provides simplified diagrams.

We trust that the above information will answer your questions and will be happy to cooperate with you in every way possible.

Yours very truly,
Audio Engineering Company

Figure What Your Profit Would Be...

WEBSTER ELECTRIC
Teletalk REG. U.S. PAT. OFFICE
Amplified Intercommunication

HERE is tangible proof that there is money in the sale and installation of Teletalk for any contractor!

The Griggs, Cooper Company, St. Paul, Minn., needed an intercommunication system to enable them to get the utmost efficiency out of a new, complex conveyor system.

After investigation, they chose Teletalk. It was sold and installed by the Audio Engineering Company. The letter shown above tells the whole story. It shows the number of Teletalk units, the hours of labor and the amount of installation material required for this job. Figure out for yourself, what *your* profit would have been on this job and you will have a good idea of the profits there are in Teletalk.

You can sell jobs like this—many contractors are doing it. If you are not familiar with this new method of amplified intercommunication and how it can be sold to both large and small businesses, write us for literature and the name of the nearest Teletalk distributor.

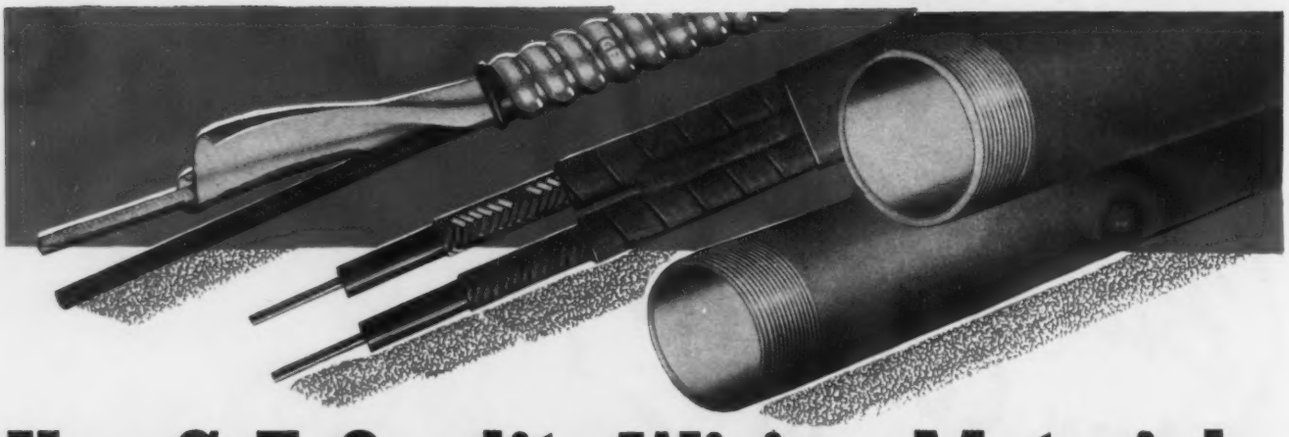
WEBSTER ELECTRIC COMPANY, Racine, Wisconsin, U. S. A.
Established 1909. Export Dept.: 100 Varick St., New York City.
Cable Address: "ARLAB", New York City

Licensed by Electrical Research Products, Inc., under U. S. Patents of American Telephone and Telegraph Company and Western Electric Company, Incorporated

Webster Electric

"Where Quality is a Responsibility and Fair Dealing an Obligation"

MANUFACTURERS OF IGNITION TRANSFORMERS AND FUEL UNITS FOR OIL BURNERS • TELETALK INTERCOMMUNICATION AND PAGING SYSTEMS • POWER AMPLIFIERS AND SOUND DISTRIBUTION EQUIPMENT • RADIO PHONOGRAPH PICKUPS



Use G-E Quality Wiring Materials For Dependable Wiring Systems

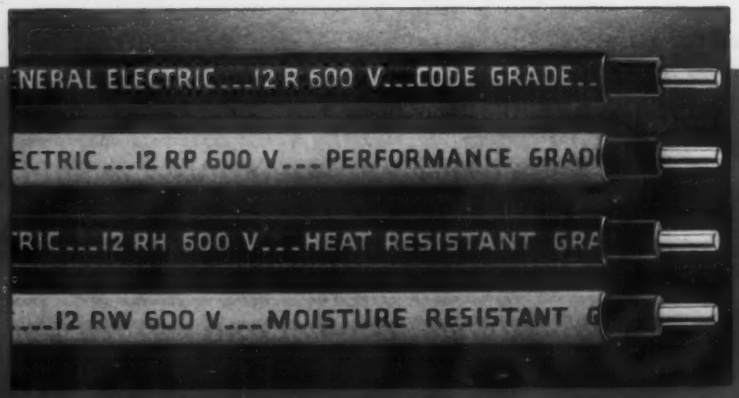
Look into the future a little way. Will your customers be pleased a few years from now with the wiring you are installing today? Will they come to you again, and recommend you to their friends?

HIGH STANDARD OF QUALITY

One sure way to have continued customer satisfaction is to install G-E Quality Wiring Materials. These materials will give dependable service. The G-E line of wiring materials is complete including materials for wiring every sort of building. G-E materials all meet the same high standard of quality. They are made to be used together and are easy to install.

3 WIRING MANUALS AVAILABLE

Three G-E manuals are available to help you in selling and installing quality wiring: an industrial wiring manual, a farm wiring manual and a home wiring manual. To obtain any of these manuals or further information about G-E wiring materials see the nearest G-E Merchandise Distributor or mail the coupon below.


NERAL ELECTRIC...12 R 600 V...CODE GRADE..
ECTRIC...12 RP 600 V...PERFORMANCE GRAD
RIC...12 RH 600 V...HEAT RESISTANT GRA
...12 RW 600 V...MOISTURE RESISTANT G

General Electric Company
Section CDW-0233
Appliance and Merchandise Dept.
Bridgeport, Connecticut

Sirs: Please send me without obligation the material checked below:

- ☐ G-E Industrial Wiring Manual
- ☐ G-E Farm Wiring Manual
- ☐ G-E Home Wiring Manual
- ☐ Information on G-E Materials

Name.....

Address.....

City..... State.....

GENERAL ELECTRIC

PAINE *Improved* Cable Clamp

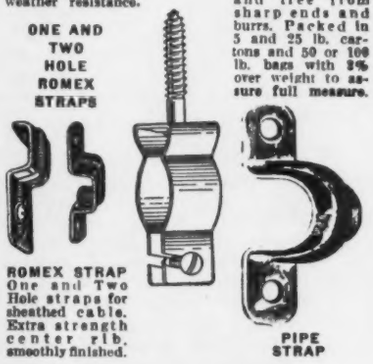
For use on cross arms, overhead beams, etc. Paine patented slot permits rapid installation . . . no fumbling or guesswork . . . slip the bolt with the nut already on into the slot and tighten. Lag screw is gimlet pointed and securely riveted to the clamp . . . clamp is galvanized for rust and weather resistance.

PAINE
Anchors Hangers Supports Fixtures
BUILDERS SPECIALTIES

PAINE PIPE STRAP

Prominent center rib adds extra strength, assuring maximum holding power. Uniform gauge materials, accurately punched. Snug, form fitting, and free from sharp ends and burrs. Packed in 5 and 25 lb. cartons and 50 or 100 lb. bags with 3% over weight to assure full measure.

ONE AND TWO HOLE ROMEX STRAPS



ROMEX STRAP
One and Two Hole straps for sheathed cable. Extra strength center rib, smoothly finished.

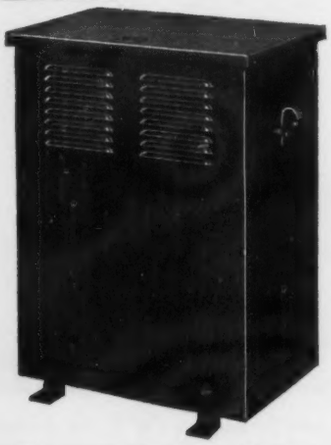
PIPE STRAP

PAINE

THE PAINE COMPANY
2975 Carroll Ave. Chicago, Ill.
Western Warehouse and Sales in
Los Angeles, Seattle, San Francisco, Denver

ECONOMICAL

Jeffries Transformers



Reasonable in Price
Reliable in Performance

Jeffries large transformers are priced reasonably—and you can save their first cost in a short time by minimizing current losses. When you use a Jeffries transformer, you can provide voltage change at the point desired, without prohibitive expense.

We supply all types and sizes. If not in stock, we build to order in a hurry—a week to 10 days.

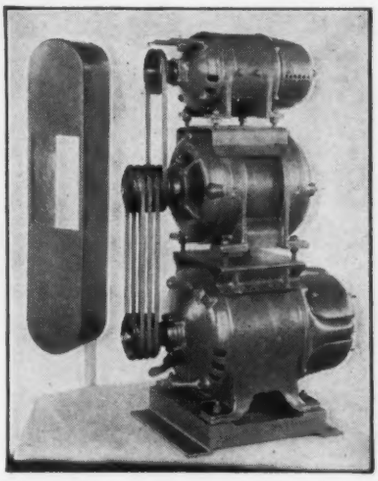
Write today for catalog

JEFFRIES TRANSFORMER COMPANY
5706 Long Beach Ave. Los Angeles, Calif.

NEW PRODUCTS

Motor Generator Sets (301)

Saving in floor space, accessibility, and the use of machines of different speeds are outstanding features of a new pyramid-mounted arrangement of three-machine motor-generator sets developed by Allis-Chalmers Mfg. Co. On the top of the generator is placed the induction motor, securely attached with a suitable base plate, and the exciter in like manner



is mounted on top of the motor. Each machine is self contained and readily removable as a separate unit. The weight of a pyramid-mounted set is also said to be less than one of conventional mounting, due to the saving of material in the base.

Rubber Boots (302)

Short circuiting of light and power lines by rats coming in contact with cables attached to oil-circuit breakers in the power house of a large eastern utility, caused company officials no end of trouble, until the United States Rubber Co., mechanical goods division,

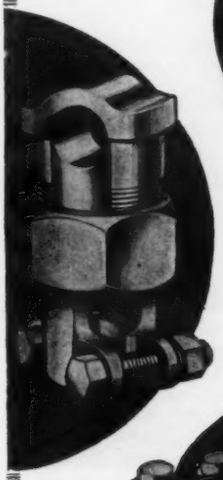
devised a rubber "boot" to fit over the insulator and up on the cable, covering the latter beyond the reach of even the largest rat.

ALL Kinds of Fittings—

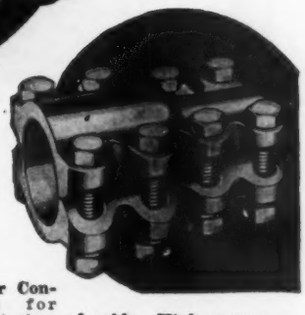
for every type of electrical connection. For any combination of tube, bar, cable, or wire.

More than 6,200 items.

Clamp Type Tees in all sizes. High copper alloy; machined contact surfaces



Self-Locking Tees that hold permanently tight. With and without extension.



Reducer Connectors for different sizes of cable. High copper with Everdur bolts, nuts, lockwashers.

You will be interested in the many NEW and IMPROVED fittings in the Penn-Union Catalog. Every item thoroughly tested, Dependable.

NICHOLAS & COOK
1063 HOWARD STREET
SAN FRANCISCO

J. W. WATKINS
538 SKINNER BLDG.
SEATTLE

PENN-UNION ELECTRIC CORP., Erie, Pa.

You'll find it in the *complete* line

PENN-UNION
Conductor Fittings

For Convenience
BANK BY MAIL

Our Bank-by-Mail Service extends the facilities of this old, metropolitan Bank to every point where mail is delivered. Both checking and savings accounts may be conducted with utmost safety and convenience.

CROCKER FIRST NATIONAL BANK
OF SAN FRANCISCO
California's Oldest National Bank

Member Federal Deposit Insurance Corporation

Actually Stronger
THAN STEEL
FOR that additional factor of safety, BLACKBURN CONNECTORS are made completely of Duronze, a silicon bronze actually stronger than steel and more non-corrosive than pure copper. For dependable and lasting connections —
Use
Blackburn Connectors
JASPER BLACKBURN PRODUCTS CORP.
Main and Clinton Sts. ST. LOUIS, MO.

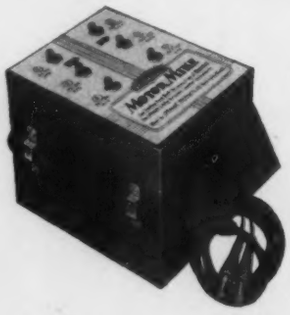
G-E Dishwasher (303)

The G-E dishwasher, model BE-40, is a complete individual appliance for separate installation in the kitchen. It is finished in white-baked Glyptal with acid-resistant white porcelain enamel rim, cover and backsplash. In operation, scraped dishes, silverware, pots and pans are placed in trays. After washing and rinsing, the dishes, dried in their own

heat, are ready to put away. One gallon of hot water, driven by the impeller, will remove every trace of dirt. The Disposall unit, which does away with fresh food wastes, has a capacity of three quarts and dispenses with kitchen garbage pans, collanders. This unit is available in only one model.

Motormike (304)

In addition to incorporating many unique features as a motor-starting capacitor indicator, Motormike, just introduced by Sprague Products Co., serves as an emergency condenser for 110 V. 60 cycle motors where capacities from 54 mfd. and 180 mfd. are required. Motormike tells promptly and accurately what



capacity should be used as a replacement on refrigerators, etc. The unit is contained in a rugged steel case, and equipped with a carrying handle. Also contains Sprague extra heavy-duty sections, which will take plenty of overload.

Suction Cleaner (305)

The Swift suction cleaner, manufactured by the Carl E. Swift Corp., is designed to remove efficiently soot and fly ash from furnaces and chimneys. This cleaner is a self-contained unit built into the form of a trailer with quick detachable auto hitch, the overall dimensions being, length, 8 ft., 3 in.; width, 4 ft. and height, 4 ft., 10 in. Two sets of

blades are used in the fan, one straight and the other curved. All of these cleaners are equipped with G-E ball-bearing, a. c. 110-220 volt, 60 cycle, 1800 r. p. m. repulsion, induction motors. The fan is mounted directly on the motor shaft, thus eliminating the necessity for belts or gears.

Radio-Proof Insulator (306)

Having developed a special conducting glaze for the purpose, the Ohio Brass Co. is now producing a complete line of radio-proof pintype insulators in which this glaze is applied under the regular glaze at critical areas. Known as conduction-glazed Silentypes, these insulators supplement the company's line of metallized Silentypes. The underglaze is applied to the conductor groove, the tie wire groove, the pine hole and the joints of multiparts. The line includes all sizes of high-voltage pintypes, both multiparts and uniparts, as well as low-voltage pintypes.

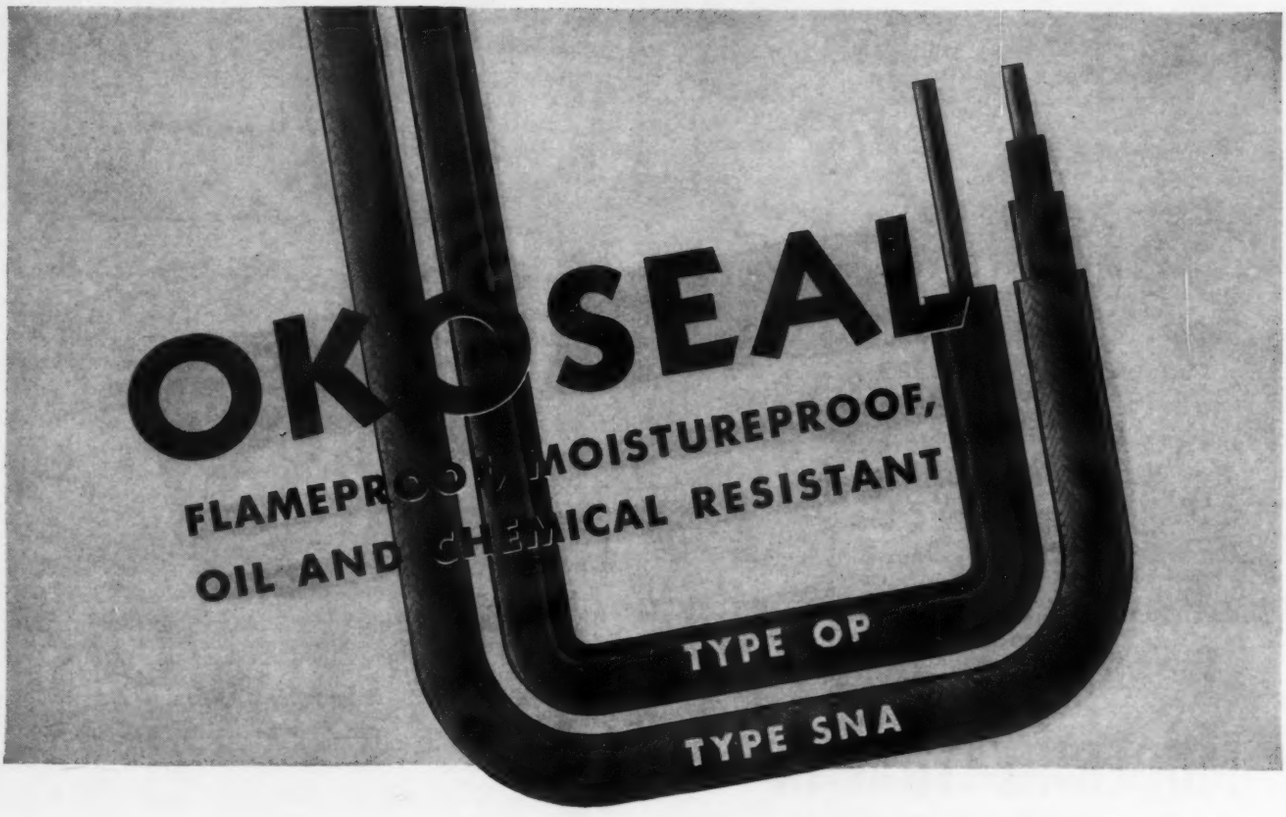
Two-way Communication (307)

Latest development in amplified inter-communication is found in the Webster Electric executive, deluxe models which provide a two-way communication without need for manual operation. These models have a separate microphone on top of the cabinet. The

speaker is for reception only. For confidential conversation, handset is removed and used as a telephone. Lifting the handset disconnects both microphone and speaker.

Circuit Tester (308)

A circuit tester, with 27 complete ranges for voltage, current and resistance measurements, has been developed by the Weston Electrical Instrument Corp. Some of its applications include checking sensitive relays, signal systems, cathode ray tubes, remote control circuits, public address systems, etc. The sensitivity of the instrument permits voltage, current and resistance measurements on oscilloscope circuits.



OKOSEAL INSULATED WIRES ARE APPROVED BY THE UNDERWRITERS LABORATORIES for the following applications:

TYPE OP Okoseal (without braids) is approved for switchboard use up to 80° C (176° F); maximum working voltage 600 volts. Available in colors.

TYPE OP Okoseal wire is also approved for use in appliances or in recognized metal raceways which do not permit the use of the usual types of insulation, specifically where exposed to oil, and a temperature not exceeding 60° C (140° F), and in accordance with paragraph 3004h of the 1937 National Electrical Code.

TYPE SNA switchboard wire (with felted asbestos and braid covering) is approved for still higher temperatures. It can be used where the temperature does not exceed 90° C (194° F); maximum working voltage 600 volts.

DEVELOPED for use under conditions which do not permit the use of usual types, this synthetic insulation possesses the following remarkable characteristics — Heat resisting . . . flameproof and will not support combustion . . . tough, resists abrasion and yet so pliable it bends around sharp corners . . . so moisture-proof that it withstands months of immersion with dielectric strength unchanged . . . leather-like in texture with a smooth finish . . . used as insulation up to 600 volts or as protective sheath on higher voltage . Write us for further information on Okoseal wires.

THE OKONITE COMPANY

Founded 1878

EXECUTIVE OFFICE: PASSAIC, NEW JERSEY

HAZARD INSULATED WIRE WORKS DIVISION

THE OKONITE-CALLENDER CABLE CO., INC.

SALES OFFICES IN PRINCIPAL CITIES

OKONITE QUALITY CANNOT BE WRITTEN INTO A SPECIFICATION

NEW IMPROVED 1940
HOTPOINT CALROD

Now Available for Replacement Sales

Make 2-Way Profit from Sales of Calrod Replacement Units, which fit practically all Electric Ranges now in use.

1 MODERNIZATION OF OLD ELECTRIC RANGES..

offers a rich profit opportunity that can now be tapped through Hotpoint's ingenious new 1940 Calrod Replacement Plan.

Over a million old-style electric ranges are waiting to be brought up-to-date in operating efficiency and economy with Calrod Measured Heat. And Hotpoint provides the program.

2 NEW SALES OF HOTPOINT ELECTRIC RANGES...

can be yours in abundance by using this Calrod Replacement Plan. It offers the greatest "door opener" for range salesmen yet devised. You get two chances at profit.

1. You can modernize the prospect's old range or,
2. You can demonstrate and sell a new 1940 Hotpoint Range with Calrod Measured Heat.

FASTER—Starts cooking in less than half minute.

LIGHTER — by 20% than other rod units.

New 1940 Self-Cleaning Calrod

New Calrod coils burn themselves clean of normal spillage. Easily removable, polished aluminum reflector can be washed like a pie tin.

Calrod is the only unit with terminals located on the side, away from spillage and heat zones. Calrod is the only unit with *Inconel* metal sheath containing 94% of nickel and chromium. Calrod is the only unit built of corrosion-resisting materials throughout.

●

Over a Million Electric Ranges Waiting to be Modernized

Cash in on the big public interest in "Measured Heat" cooking by modernizing old-style electric ranges with the great new 1940 Calrod Replacement Plan.

Your customers are pre-sold by Hotpoint's great national advertising program.

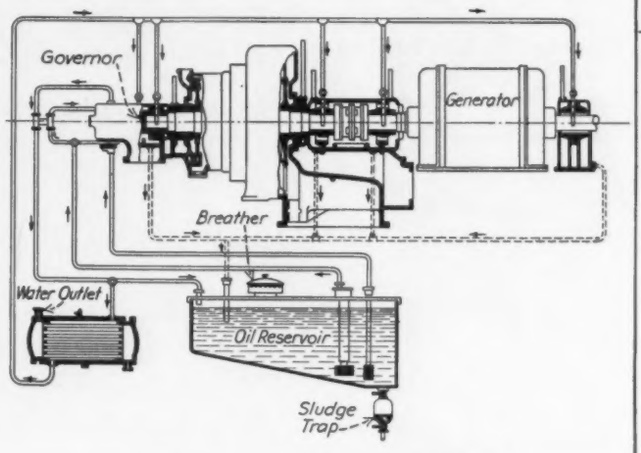
Now you can sell this market easily with quick turnover of stock because Calrod sells at prices 12% to 18% lower than formerly. Only 7 Stainless Steel adapter rings needed to fit practically all ranges now in use. Get all the details about this great plan now. Talk to your Hotpoint district representative or distributor.

EDISON GENERAL ELECTRIC APPLIANCE CO., INC.
5612 W. Taylor Street, Chicago, Illinois

Hotpoint
Calrod

THE ONLY ELECTRIC RANGE SURFACE UNITS W
INCONEL SHEATH AND GLASS SEALED TERMINA

A LITTLE EXTRA HEAT GOES THE WRONG WAY



LAYOUT OF TYPICAL TURBINE PRESSURE CIRCULATING SYSTEM

An important function of a turbine lubricant is withstanding the effect of excess temperatures

YOU operators make heavy demands on the lubricant that protects your turbine bearings. For you often run them continuously for months—even years—at a stretch.

Turbine rotors, some of them, weigh many tons. And your only protection against loss of the bearing, against costly shutdowns, rests in a film of oil, at times no thicker than a piece of tissue paper. If it gives way for an instant . . . you pay.

Heat—and Your Oil Film

No, the right oil doesn't give way . . . not if it is so refined that it retains all its effectiveness in service. But from the moment it goes to work for you, it is constantly beset by heat—the enemy whose chief joy in life comes from breaking down an oil. Take away heat, and your lubricant, despite aeration and contact with metals and with water, does not markedly change its structure.

But You Can't "Take It Away"

Designers and operators of turbines have done and are doing all they can to keep down bearing temperatures. As you know, they have improved them . . . by adopting water-cooled bearings, by water seals between turbine housing and bearing, by oil coolers, by circulating systems which insure plenty of oil. Despite all their efforts, bearings keep on getting too hot for comfort—the oil's comfort.

And you know why: Some superheated steam is bound to leak through the gland seals. Some heat is bound to travel across from the rotor shaft. Bearings occasionally develop tiny "hot spots," which raise the temperature. All these increase the normal frictional heat induced by the rotor shaft's high speed.

What Twenty Degrees Can Do

The trouble is not, of course, that turbine bearing temperatures are excessively high. Somewhere between 110° and 160° F. is normal for most circulation-oiled bearings. What does make your lubrication difficult is that such a slight increase in temperature causes such a big increase in rate of oil oxidation. Did you know that an increase of only 20° F. *can double the rate of oxidation?*

When Oxidation Strikes

Without excess heat, there is little oxidation. But since you always do have excess heat to some degree, let's run over some of the evils that result from oxidation. 1. Your oil tends to break down, then emulsifies. 2. A vicious circle starts when insoluble sludge is deposited on cooler coils (more heat!). This sludge may also clog oil-supply lines and, in the governor, may keep your valves from seating as they should. 3. Finally, too-high temperatures may form active acids which, with water, may corrode bearings, governor and surfaces of cooler.

• • •

The operator of a turbine can control the heat only to a limited extent. He can take extra care that glands don't leak. He sees to it, of course, that sludge is thoroughly cleaned out when oil is changed. He chooses his lubricants with the aid of lubrication men who have a broad experience in specifying turbine oils that resist heat under the actual working conditions of many different designs. Shell has been able to improve lubrication and lower costs in many turbines. What is your problem? Let us help you.

SHELL

SHELL TURBO OILS

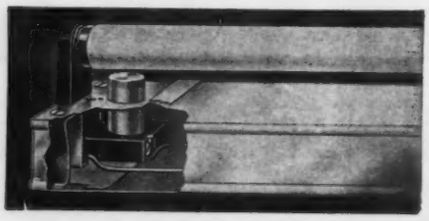
Floodlight (309)

A handy, portable utility floodlight known as the Circulite, has been introduced by the Steber Mfg. Co. This unit has wide applications for lighting objects and operations not sufficiently illuminated by general lighting in garages, service stations, factories, warehouses, display rooms and the home. It has been designed for the new "sealed beam" PAR-38,

150 watt, incandescent projector lamps, spot or flood. The lamp holder is mounted on a round, pressed-steel base with 20 ft. of approved, flexible, hard-service cord and rubber attachment plug.

New Fitting (310)

A fitting to accommodate the latest type fluorescent lamp holders with FS-2 or FS-4 starting switch mounted in the base of the lamp holder, has been presented by the Wiremold Co. The new fitting snaps into the standard Wiremold fluorescent lighting channel providing a support for the complete lamp holder and starter switch unit at one end of each lamp assembly. Wiremold reflectors have



knockouts to accommodate this switch. The unit is so designed that the lamp holder only can be used when desired.

Disconnect Switches (311)

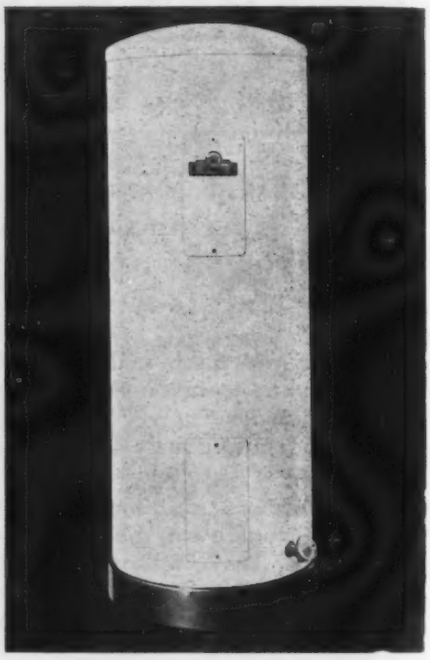
Recently presented to the industry by the James R. Kearny Corp., is a complete set of Sub-NEMA disconnect switches for loads of 200 or 400 amp. and for voltages through 15,000. The 200 amp. switches have line type contacts at each end of the blade while the 400 amp. units use strong point pressure contacts at both ends of the blade. Both the 200 and 400 amp. switches are equipped with Sub-NEMA station-post type insulators, and both have strong locks to hold the blades closed against magnetic or gravitational pulls.

Range Switch (312)

A new type of switch construction by The Hart Mfg. Co. makes possible greater flexibility of the top plate control of electric ranges. From high speed heat to a low simmer may now be obtained in six or seven stages. The right degree of heat can be set for large or small utensils on the same two or three coils of the top plate.

Water Heater (313)

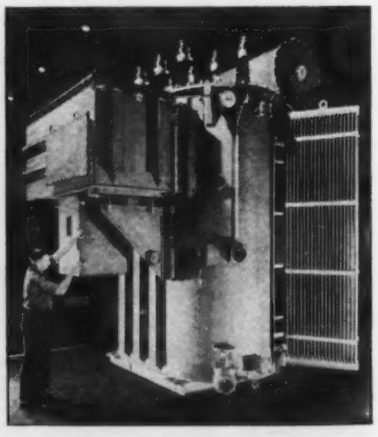
One of three new electric water heaters of cylindrical type introduced this year in 30, 40 and 50 gal. sizes, by the Frigidaire Division, General Motors Sales Corp., is illustrated below. Addition of these models to the Standard Frigidaire line of table top and up-



right models, provides an efficient water heater where low price is a dominating factor. Tanks are galvanized, and the company offers a choice of single or double heating units.

Transformer Mechanism (314)

A transformer load-ratio-control mechanism has been developed by Allis-Chalmers Mfg. Co. to supplement its already well-established regulating mechanisms. This new type is designed for application on medium-large regulating and power transformers, single or three-phase, and can be arranged for automatic or manual control. Dial switches and rotary-breakers are mounted on separate oil-



filled compartments with complete mechanical interlocking so that the tap changing circuits are closed and opened by the breakers while changing taps. The driving motor and control apparatus are mounted in a weatherproof housing directly below the dial switch and rotary breaker compartments.

RELAYS

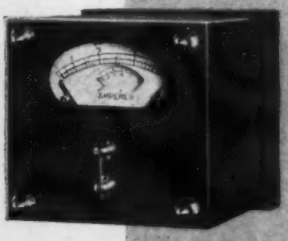
WITH PEP

The conciseness characteristic of all Ward Leonard Relays, is due to sound engineering and careful workmanship. The very attributes that impart precision assure ruggedness and long life. Ward Leonard Relays are made in a wide variety of sizes, types and contact arrangements. Send for Bulletins describing relays of interest to you.

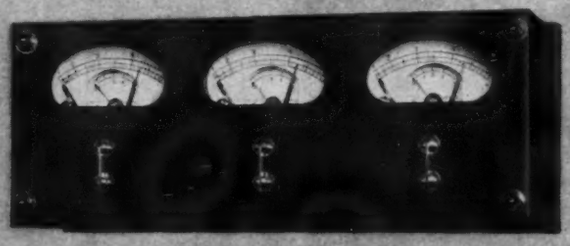
WARD LEONARD
ELECTRIC COMPANY
48 SOUTH STREET MOUNT VERNON, N. Y.
Electric Controls Since 1892

Ampere Demand on SUBSTATION FEEDERS

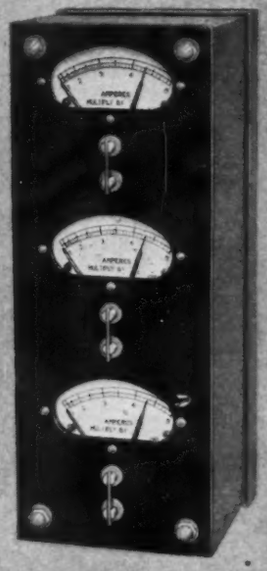
measured economically and practically



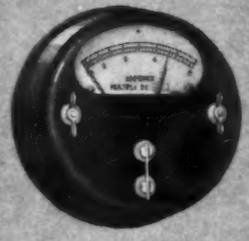
TYPE ADW, SQUARE STYLE*



TYPE 3-ADHW, TRIPLEX STYLE*

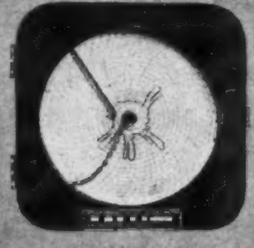


TYPE 3-ADV, TRIPLEX STYLE



TYPE AD, ROUND STYLE

*Combined with instantaneous ammeter, which can be supplied in any of the above instruments.



TYPE CCA, GRAPHIC

LINCOLN AMPERE DEMAND METERS

Show at a glance

★ THE MAXIMUM DEMAND THAT HAS OCCURRED . . .

★ THE AMPERE DEMAND AT ANY TIME . . .

MEASURING ampere demand on station feeders is an economical and practical method of determining the load conditions of station and feeder equipment. Lincoln Ampere Demand Meters are ideal for this purpose, because two indications, available at all times, tell the story at a glance: First, the *maximum demand* since the last manual resetting of the pointer. Second, the *immediate demand.*

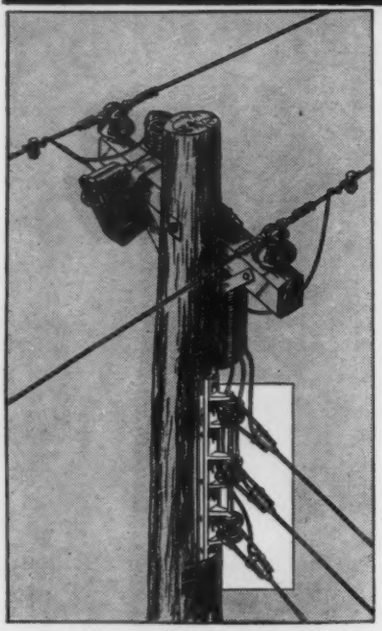
Being of the thermal type, Lincoln Demand Meters operate in accordance with the *heating effect of the current* — the same factor which determines the load capacity of the distribution equipment. As simple in operation as a common indicating ammeter, but highly time-lagged, Lincoln Meters perform practically maintenance free.

In keeping with the present trend for greater economies in construction and operation, you, and other engineers will discover interesting facts about modern demand measuring practices, by writing for full details to

LINCOLN METER COMPANY

SPRINGFIELD • ILLINOIS

modernize
YOUR
DISTRIBUTION
PRACTICE—



Single phase grounded neutral in city distribution.

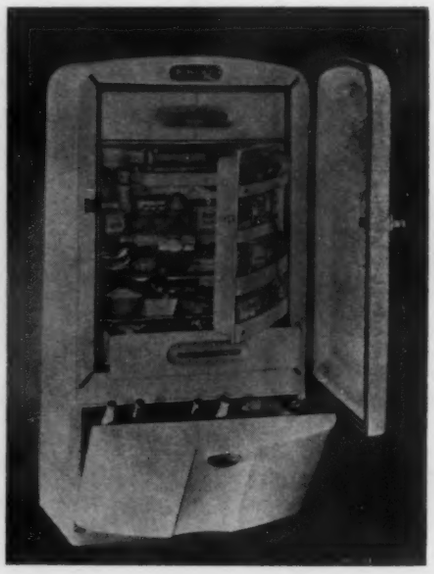
RELIABLE
STRAIGHT-
THRU
DEAD
ENDS

Reliable Straight-thru Dead Ends with flexible clevis are low in cost and permit the use of hard wire in secondaries. They simplify the take-up of slack — easily installed on either strain or spool insulators.

Reliable
ELECTRIC COMPANY
OVER 25 YEARS SERVICE TO THE UTILITIES
3143 FARRELL AVENUE CHICAGO ILLINOIS

Philco Refrigerator (315)

Philco Radio & Television Corp. have entered the refrigerator business. Before the public are to go eleven new models, the majority of them featuring the Conservador, a shelf-lined inner door, which is a refrigerator within a refrigerator, giving new finger-tip space, doubling the front-of-the-shelf space, and enabling housewives to protect food in the inner compartments on the "storm door" principle. The new Philco refrigerator gives three kinds of cold with every temperature and



humidity zone needed. It has a large frozen food compartment next to the ice cube storage chamber. A full width, fully visible, glass covered porcelain sliding crisper drawer has been designed to keep fruits and vegetables crisp and fresh. A meat storage compartment located near the freezing unit is extra cold and of large capacity. The power unit is extremely simple and comes hermetically sealed in a heavy, solid steel dome. A five year guarantee will give customers full protection on every model.

Photoelectric Relay (316)

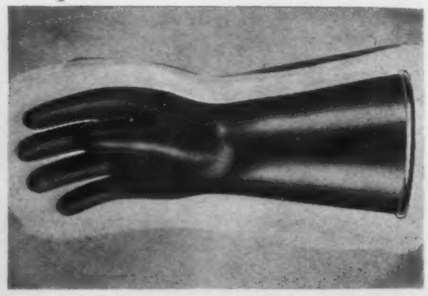
A compact photoelectric relay which can be used for counting, sorting, weighing, measuring, signalling and similar functions, has been developed by Westinghouse Electric. Designated as type RQ Photo-Troller, this device is especially designed for low operating expense, low initial cost, and ease of installation. It has two normally open and two normally closed contacts, each rated at 10 amp. on 115-volt a. c. circuits. It operates on a change of 40 ft.-candles, if not more than 15 ft.-candles of extraneous light are present.

Control Relay (317)

To fill the need for a light-duty closing relay, General Electric has introduced the Type HKA pump-free control relay for oil circuit breakers equipped with "cut-off" switches. The relay consists of two elements, an operating element, and an auxiliary element. The former picks up and closes its main contacts for the closing solenoid and at the same time seals itself in. The auxiliary element is energized by a solenoid cut-off switch closed by the operation of the solenoid mechanism. In place of the conventional blow-out coil, there is provided a permanent blow-out magnet of Alnico.

Electrician's Glove (318)

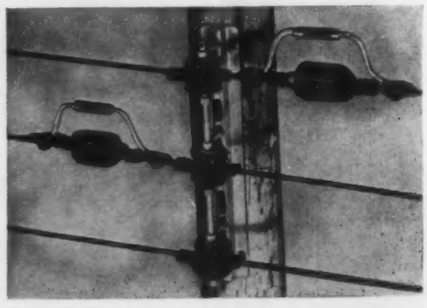
Called the "Curv-Flex," a new electrician's glove made by the Miller Rubber Co., is not only shaped to the contour of the hand, but also is scientifically designed in fingers, wrist and cuff to promote greater freedom and comfort. Made by the Anode process, a patented



technique in which virgin latex is deposited on a form without sacrifice of its original strength, the glove withstands repeated electric tests over long periods and has high resistance to current leakage even after soaking in water.

Fuse Links (319)

A new line of indicating type, secondary fuse links has been introduced by Schweitzer & Conrad, Inc. They are rated 115/230 volts and are available in amp. ratings from 5 to 200 incl. These links offer a combination of features not available heretofore. All internal parts are totally enclosed both before and after blowing. The assembly does not sepa-



rate and no loose ends are left dangling. Products of link melting are retained and condensed within the tube. The indication is positive and easily detected from the ground.

Rectifier (320)

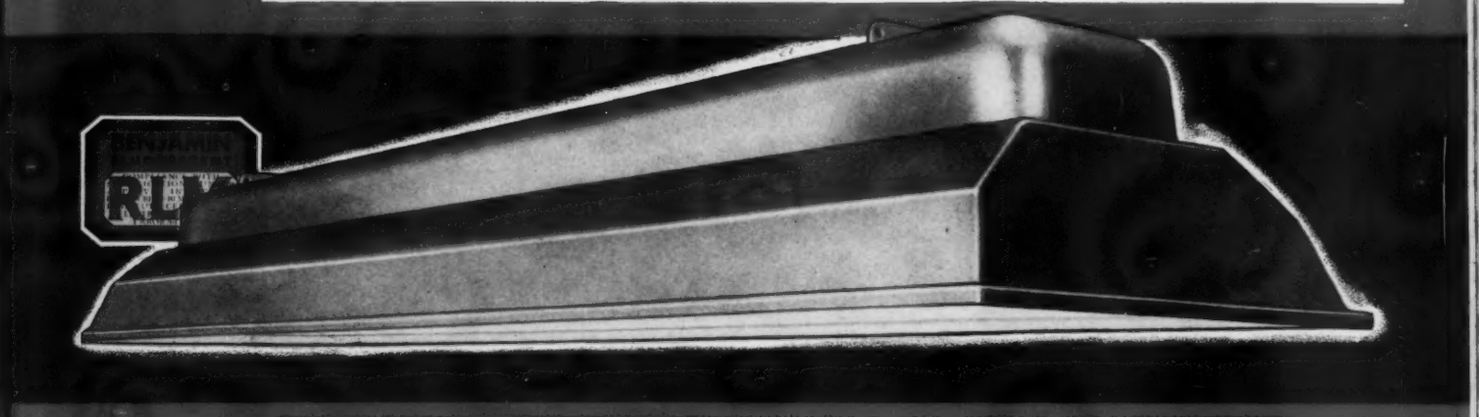
The operation of a new rectifier manufactured by the Electrical Facilities, Inc. is based on the rectifying action of metallic selenium. Each plate consists of an iron disc coated with selenium and a layer of an alloy which provides a suitable contact surface and insures uniform current density in the active material. The selenium stack, being essentially an assembly of rugged metal parts, will withstand severe shock and vibration without rectification characteristics being affected. It is silent, dependable, and instantaneous in operation. Small size and light weight are other features.

DURABLE PORCELAIN ENAMEL REFLECTOR—EASY to CLEAN

Time has proven the superior diffusion, sustained efficiency, low maintenance cost and durability of porcelain enamel reflectors. Unaffected by heat, cold or atmospheric conditions, it is easily restored to initial efficiency by washing with soap and water.

Learn the Facts and See the Advantages of Fluorescent Lighting First Hand!

REQUEST A FREE DEMONSTRATION OF THE BENJAMIN RLM STREAM-LITER IN YOUR PLANT!



ONE-QUARTER of the RADIANT HEAT-LAMPS COOL to TOUCH

Foot candle for foot candle, STREAM-LITER Fluorescent lighting has one-quarter the radiant heat of other forms of lighting—ideal for air-conditioned interiors, work on delicate mechanisms or where lighting units are located low over the heads of workers.

CLOSED REFLECTOR ENDS and PROPER CUTOFF SHIELD EYES

STREAM-LITER'S deep reflector design provides a 30° degree angle of cutoff—the accepted standard of good lighting practice—which together with closed reflector ends assures adequate shielding to hide lamps from view at normal angles of vision.

UNTIL you've had an actual demonstration of Fluorescent Lighting as provided by Benjamin RLM Stream-Liter Units, you cannot possibly appreciate the truly remarkable qualities of this new lighting and the constructional and operating superiorities of the Benjamin RLM Stream-Liter Unit.

Why Thousands of Plants Have Installed the Stream-Liter!

The new sensation of restfulness . . . comfort . . . and ease of seeing which you will experience under Benjamin Stream-Liter Fluorescent Lighting will make immediately evident the reasons why thousands of plants have installed Benjamin Stream-Liter Units for general illumination.

Through such a demonstration you will gain a better conception of the important part Fluorescent Lighting is destined to play in all future factory lighting. It will enable you also to secure quickly the salient quality construction, operating and installation features of the Benjamin Stream-Liter which have made it the leading Fluorescent Lighting Unit for general plant illumination.

No Cost or Obligation

All arrangements for your demonstration will be made by Benjamin through your local electrical wholesaler. Simply mail the coupon or address your letter to the Benjamin Electric Mfg. Co., Des Plaines, Illinois, makers of Lighting Equipment for every industrial requirement including a complete line of Fluorescent Lighting Equipment for both general and localized illumination.

BENJAMIN TRADE MARK
LIGHTING EQUIPMENT
Distributed Exclusively Through Electrical Wholesalers

FREE-DEMONSTRATION REQUEST

BENJAMIN ELECTRIC MFG. CO.
Des Plaines, Illinois.

We would like to have you arrange a special demonstration of your STREAM-LITER Fluorescent Lighting Unit in our plant on or about _____ with the understanding there is to be no cost or obligation.

Name _____

Firm _____

Address _____

City _____ *State* _____

Our Wholesaler is _____

with

CHROMALOX

SUPER-SPEED RANGE UNITS

Sell these big CHROMALOX features and sell more ranges. Many other advantages with this unit, too. They're supreme for replacements — Fit all ranges. Write to our nearest distributor and get all the facts.

MONTGOMERY BROTHERS
911 Western Ave., Seattle, Wash.
1501 N. W. Kearny St., Portland, Ore.
61 Fremont St., San Francisco, Calif.
420 S. San Pedro St., Los Angeles, Calif.
THE PETERSON COMPANY
1921 Blake St., Denver, Colo.
EDWIN L. WIEGAND CO.
7540 Thomas Blvd., Pittsburgh, Pa.

For Better Service—

INSTALL TRICO REG. U.S. PAT. OFF.

RENEWABLE FUSES
With the famous Powder-Packed Element

KLIPLOK CLAMPS
Lock fuses and clips together

KANTARK FUSES
With genuine fibre tubes (not paper)

COLORTOP PLUG FUSES
The color tells the size

FUSE PULLERS
Pull and replace fuses safely

GLASS OILERS
For motors, line shafts, solid bearings etc

UNBREAKABLE OILERS
"Opto-Matic" Constant level type
Gravity Feed type

WRITE FOR FOLDER CPF-300

TRICO FUSE MFG. CO., Milwaukee, Wis.

M. L. Woodard, 387 9th St., San Francisco
W. E. Young Co., 1944 Broadway, Denver

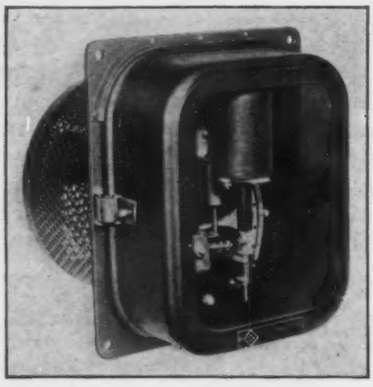
Solderer (321)

An electric solderer especially recommended for all kinds of light soldering has been developed by the Ideal Commutator Dresser Co. Called the "Instant Heat" because it heats instantly upon touching the wire or terminal to be soldered, this tool is ideal for service work. Being hardly larger than a

lead pencil, it easily reaches and solders in difficult places. Heating stops instantly upon taking the carbons away from the wire or terminal. It is safe to use. There is no danger of shock or burns. Power consumption is approximately 80 watts.

Voltage Regulator (322)

A rocking contact voltage regulator for control of small a. c. and d. c. generators has been introduced by Allis-Chalmers Mfg. Co., Switchgear division. This improved regulator is even more sensitive, quicker acting and of greater capacity than the company's earlier small regulator models. There are no vibrating contacts, tubes or other parts requiring replacement or readjustment at frequent intervals. It is quick acting in that it regulates the voltage by directly varying the resistance in the exciter field circuit.



Light-Emitting Paints (323)

A new series of twelve light-emitting paints called Conti-Glo, have been perfected by Continental Lithograph Corp. Surfaces painted with them emit vivid colored light when invisible "near" ultra-violet radiations are played upon them. Light from the coatings is turned "on" or "off" by control of this beam. The unseen beam of near ultra-violet radiations, now commonly referred to as "black light," is perfectly harmless. It is generated in simple "black" bulbs and is directed by means of ordinary aluminum reflectors onto the lacquer-enamel coated surface.

Crapo
GALVANIZED PRODUCTS

Steel Strand

Telephone and Telegraph Wire

Where strains and stresses are heaviest, where corrosion takes its greatest toll, *Crapo* Galvanized Steel Strand and Telephone Wire constantly are proving their outstanding superiority. The heavy, tenaciously bonded zinc coating, maximum tensile strength and correct ductility insure longer life and lower maintenance cost. Insist upon *Crapo* Galvanized Products for better performance under all conditions! Ask your Jobber or write direct!

INDIANA STEEL & WIRE CO.
MUNCIE, ♦ INDIANA

Crapo Galvanized Strand and Telephone Wire can be obtained readily in all standard grades and sizes.

SPEED UP YOUR PROFITS

***with* IDEAL**

1. **"Wire-Nuts"**—Save on materials—no solder, no tape, no blow torch or fuel. Get a quick O.K. from the inspector or owner. No trouble, no bother. Better electrically—stronger mechanically. A size for every common wiring joint.
2. **"E-Z" Wire Strippers**—Neatly, easily strip toughest insulation without nicking or cutting strands. Strip solid or stranded wires from No. 30 gauge to No. 5.
3. **Cable Ripper and Wire Gauge**—Cleanly rips non-metallic sheathed duplex or lead covered cable. Case-hardened cutting point gives long service.
4. **Joist Boring Machine** — Bores holes at any angle. Operates from floor—eliminates climbing up and down ladder, dangerous reaching, back-breaking effort. Quickly adjustable for overhead work up to 11 feet.
5. **Fuse Clip Clamps**—Cut down resistance between clips and fuses, insuring 100% contact. Insulated skirt protects fingers from live parts. Seven sizes for gripping wide or narrow Ferrule or Knife Type Clips.
6. **Fish Tape, Reels and Pullers**—No expensive tape breakage—no live contacts. Cost and trouble of fishing reduced to a minimum. Available in 7 sizes. Junior Size $2.50 with 50 ft. of tape.
7. **Test-Lite and Fuse Puller** — Handy pocket size combination tool tests live circuits and pulls fuses.
8. **Fuse Reducers** — Protect over-fused circuits. All sizes available.
9. **Fuse Pullers** — Eliminate danger of pulling and replacing cartridge fuses by hand. Made of laminated fibre in 4 sizes.

IDEAL SOLD THROUGH JOBBERS

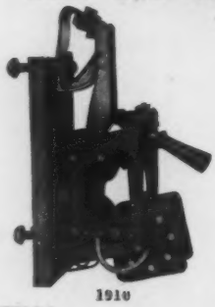
Electrical Products Division
IDEAL COMMUTATOR DRESSER COMPANY
1042 PARK AVENUE SYCAMORE, ILLINOIS

Buses lined up perfectly, with bends formed to match exactly; this is an installation of which the workmen can well be proud. It will retain its fine appearance, too, for bus and fittings are Alcoa Aluminum.

Tubular Alcoa Aluminum Bus, though light in weight, is very rigid. Supports can be widely spaced. Weight of supporting structures can be lower, with the result that material and construction costs are less. Alcoa Aluminum conductors, whether tubular, flats, angles or channels, offer a high degree of electrical and thermal efficiency.

Simple, inexpensive fittings are available for use with Alcoa Aluminum Bus. Standard construction methods are employed; joints may be welded or bolted. If you are considering the installation of bus bars, write to us for recommendations. ALUMINUM COMPANY OF AMERICA, 2132 Gulf Building, Pittsburgh, Penna.

DOWN THROUGH THE YEARS ROLLER-SMITH LOW VOLTAGE AIR CIRCUIT BREAKERS have had INVERTED TYPE CONTACTS



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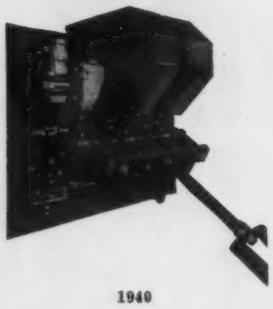


1940

WHY?

Inverted type contacts are necessary to take advantage of the magnetic forces produced by heavy currents—thus increasing the contact pressure between the stationary and movable contacts. . . . When the current is heaviest, contact pressure is greatest—as it should be. . . . This maximum pressure when needed is obtained by the inherent design of R-S breakers, and does not depend upon the use of heavy holding springs. . . . **Main, secondary** and **arcing** contacts are **all** of the inverted type, insuring the contacts remaining closed until latch mechanism is tripped and also assuring opening of the contacts in proper sequence—thus protecting the main contacts from burning. . . . Arcing contacts are tungsten alloy, highly resistant to the effect of frequent arcs. . . . The inherently better design of R-S Breakers has been proved by over 100,000 installations during the past 40 years. . . . You can specify them with confidence.

Send for Catalog P-5

ROLLER-SMITH COMPANY
Electrical Measuring and Protective Apparatus

MAIN OFFICE AND WORKS: BETHLEHEM, PA., U. S. A.
Sales Agencies in Principal Cities in United States and Canada

Sherman CONNECTORS

Electrically Efficient!

Easy to Assemble

Sherman wire connectors and clamps are designed and built to meet the specific needs of the light and power industry.

Every item is made for fast assembly and lasting electrical efficiency. Prices, too, are remarkably low—the result of quantity production on special precision machines.

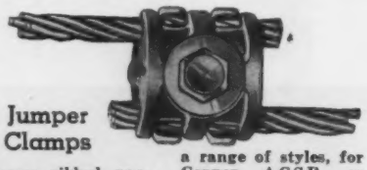
Examine and test these connectors for yourself. You'll readily see why Sherman supplies such a large proportion of today's requirements.

Split Bolt Connectors

Highest grade special alloy bronze, with strong, clean-cut threads. Solid spacer, full hex head, long pilot. With or without nut retainer.

Wedge Grip Connectors

Made entirely of pure copper, and designed to provide extra wedging and snubbing action. Non-removable screw.



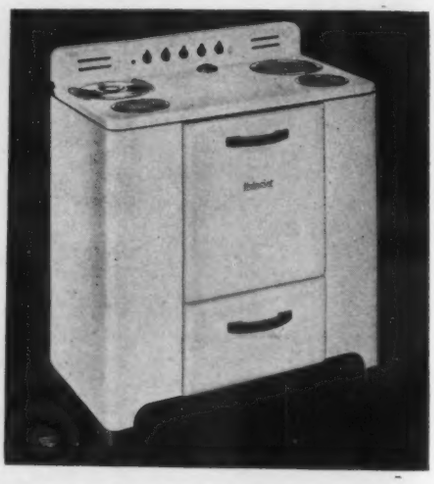
Jumper Clamps

A heavy, ribbed, parallel groove clamp for jumper, tapoff, service or other wire connections. Made in a range of styles, for Copper, ACSR, or Galvanized Steel Strand connections. Ask for Bulletin No. 25.

H. B. SHERMAN MANUFACTURING CO.
BATTLE CREEK, MICHIGAN

New Hotpoint Range (324)

Announcement has just been made by Ward Schafer, manager, Hotpoint Electric Range division, of a new, full-size Hotpoint electric range model, having standard 1940 equipment, which will sell in most localities for under $100. This Hotpoint Century is an addition to the Hotpoint 1940 line. It is all-porcelain finished, built-to-the-floor construction with the famous one-piece Monotop cooking top. Surface units are the new 1940



Hi-Speed Calrod with five heats, hinged connection blocks, and one-piece, polished aluminum reflector pans. The famous three-heat Thrift Cooker has the new 1940 aluminum cooker pail, with quart markings embossed on the side, and is equipped with an aluminum trivet.

Correction

The range shown under the heading "Universal Ranges," p. 6, February issue, ELECTRICAL WEST, should be reversed with the one on page 8 under the heading of "Hotpoint Ranges."

PRODUCT DATA

Regulators (325)

An 8-page publication by the Burlington Instrument Corp. lists and describes their line of automatic generator voltage regulators. Application, sensitivity, voltage regulation, construction are discussed together with operation, maintenance, adjustments and installation. A section of the bulletin is devoted to parallel operation, illustrated by a connection diagram. Data for determining the size of regulator to use is also given.

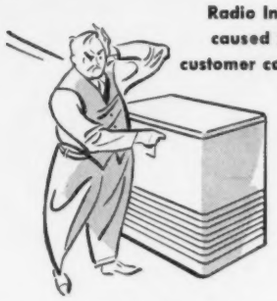
Alloy Data Book (326)

A Data Book on electrical heat-corrosion-resisting alloys has been published by the Driver-Harris Co. This 56-page publication covers general information on Nichrome, an original D-H nickel-chromium resistance alloy, together with wire and strip data on Chromax, Advance and Comet wires and nickel iron alloys. Miscellaneous and useful data comprise the balance of this complete catalog.

Distribution (327)

Advantages in fusing low-voltage, secondary distribution systems are discussed in a new bulletin just issued by Schweitzer & Conrad, Inc. The publication presents a new line of indicating secondary links which offer a combination of advantages not heretofore available.

WHY A QUAKER STATE UTILITY SELECTED R-I-P PORCELAIN

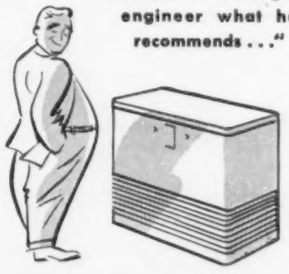


Radio Interference caused numerous customer complaints . . .

"What you need is R-I-P Porcelain protection . . . It's guaranteed . . ."

"R-I-P Porcelain means good-bye to radio interference . . ."

"Let's ask the Westinghouse engineer what he recommends . . ."



"This set used to be noisy . . . Just listen to it perk now."

"Those new R-I-P lines sure are quiet."

Radio Interference Eliminated on More Than 500 Miles of Rural Lines

A Pennsylvania utility, faced with numerous complaints from radio users along its distribution lines, decided that immediate action was necessary. They sent for the Westinghouse porcelain engineer. He recommended R-I-P Porcelain . . . explaining that Westinghouse had developed it specifically to eliminate radio interference generated at the insulator. A patented metallic oxide glaze matured during normal firing is the secret.

Result? No insulator noise now apparent . . . and the utility has standardized on Westinghouse R-I-P Porcelain for all rural service.

This utility is only one of scores in the United States that have freed their distribution lines from this annoying source of customer complaint. As a matter of fact, in one short year the Central Station Industry has turned from lack of such protection to complete protection through this Westinghouse development . . . individual operating companies, with operating capacities totalling over 8,639,270 KW (nearly ⅓ of the U. S. total) have approved and installed R-I-P Porcelain.

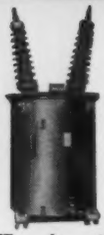
If you have a radio interference problem, by all means investigate this proved development of the Westinghouse Research Laboratories. Two completely modern plants—in Derry, Pa. and Emeryville, Cal.—will supply your every need. Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., Dept. 7-N.

J-05097

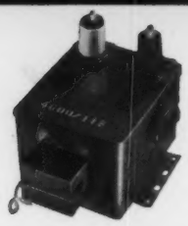
Westinghouse Porcelain

W WESTINGHOUSE ELECTRIC

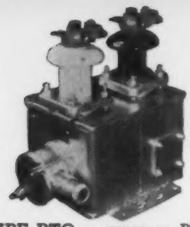
POTENTIAL TRANSFORMERS



TYPE VP . . . for extremely accurate high-voltage metering and relaying.
VOLTAGE RATIOS:
23,000/115 to 161,000/115

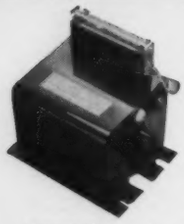


TYPE PT . . . high-accuracy indoor service transformer to withstand severe impulses.
VOLTAGE RATIOS:
230/115 to 13,800/115

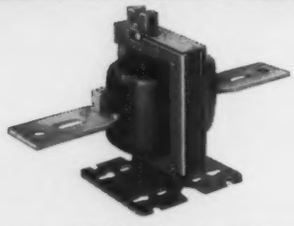


TYPE PTO . . . same as PT, but for outdoor service, with solderless connectors.
VOLTAGE RATIOS:
230/115 to 13,800/115

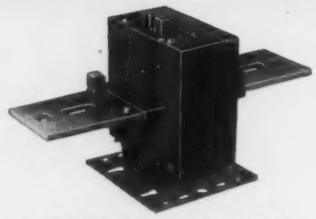
CURRENT TRANSFORMERS



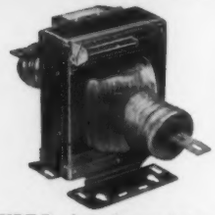
TYPE FW . . . for watthour and network current metering, accurate to 200% overcurrent.
RATINGS: 200/5 and 600/5 amps.
VOLTS: to 1,000



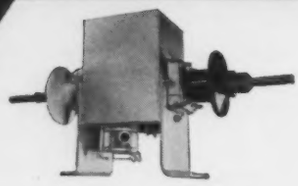
TYPE WE . . . inexpensive, low-voltage metering and network transformer, to EEI standards.
RATINGS: 200/5 and 400/5 amps.
VOLTS: to 600



TYPE UE . . . similar to WE, low cost for low-voltage metering, to EEI standards.
RATINGS: 600/5 amperes.
VOLTS: to 600.



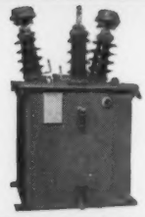
TYPE R . . for indoor metering and high-speed relaying . . differential protection . . interchangeable.
RATINGS: 5/5 to 1,000/5 amperes.
VOLTS: to 23,000.



TYPE RO . . . for high-accuracy outdoor substation metering and relaying.
RATINGS: 5/5 to 800/5 amperes.
VOLTS: 5,000 to 15,000.

TYPE OPC . . . extremely high-voltage metering transformer, new compact porcelain case, oil or inerteen insulated.
RATINGS: 5/5 to 1,000/5 amperes.
VOLTS: 25,000 to 161,000.

TYPE OP . . . high voltage, for accurate metering and simultaneous instrument operation.
RATINGS: 5/10 to 400/800 amps.
VOLTS: 23,000 to 161,000.



TYPE MP . . . high-voltage oil immersed metering transformer mounting.
RATINGS: 5/10 to 400/800 amps.
VOLTS: 2,300 to 138,000.

Accurate Low Cost METERING AND RELAYING with Precision-Made Westinghouse INSTRUMENT TRANSFORMERS

COMPLETE LINE PERMITS SELECTION FOR UTMOST ECONOMY AND SUITABILITY

There is a Westinghouse Instrument Transformer for every metering and relaying application, indoors and out . . . with built-in capacity characteristics to take most severe service, yet, with accuracy for hairline precision. This wide safety margin and true performance make Westinghouse potential and current transformers genuine time and money savers.

Extra capacity is furnished where needed for maximum protection against high overcurrents and lightning surges . . . hermetically-sealed, dry-packed and oil-immersed units are provided for *weather-tight* requirements . . . *space-saving compactness* has been introduced to meet modern layout conditions, together with neatness and simplicity of design . . . and *super-accuracy* to assure dependable metering in every application. Ask your Westinghouse representative to show you in detail the custom-made protection afforded by this complete line of Westinghouse Instrument Transformers.

J-70243

Westinghouse Transformers

RELEASE KVA CAPACITY FOR ADDED REVENUE

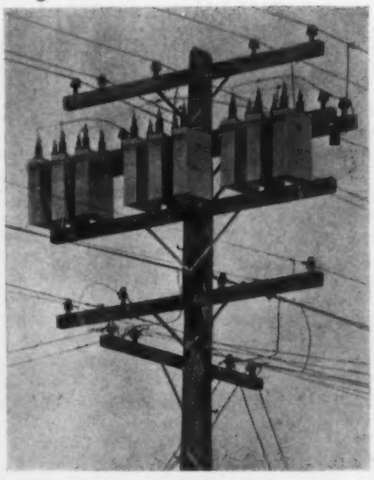
SMALLER LINE LOADS . . BETTER VOLTAGE REGULATION . . REDUCED POWER BILL . .

LOWER LOSSES . . . . HIGH STABILITY . . . . HOT TINNED CONTAINER

FAST CAPACITORS

IMPROVE VOLTAGE REGULATION

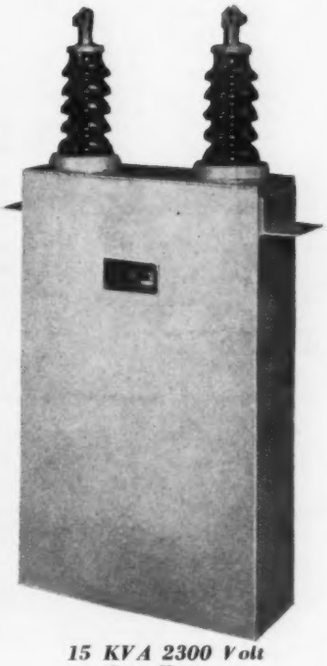
and in addition raise the power factor of the system, releasing KVA capacity for added KW load and revenue



135 KVA 2300 Volt Installation

SAVINGS FROM TYPICAL "FAST" INSTALLATIONS PAY FOR THE COST OF EQUIPMENT IN LESS THAN TWO YEARS TIME. LET OUR REPRESENTATIVE CHECK YOUR CORRECTION NEEDS. HE CAN SHOW YOU HOW TO SAVE MONEY.

"FAST" capacitors are well designed with a generous safety factor, carefully assembled, rigidly tested. They are equipped with high quality porcelain bushings. Units are housed in acetylene welded, steel containers, hot tinned and weather-proofed with three coats of paint.



15 KVA 2300 Volt Installation

The "FAST" unit reflects the benefit of our 21 years of experience exclusively in the manufacture of capacitors.

John E. Fast & Co.

Established 1919

3123 NORTH CRAWFORD AVENUE CHICAGO, ILLINOIS

West Coast Representatives:
WALTHAM, DE WITT & KRUSI, 630-632 Monadnock Building, San Francisco, California

THE FINEST POLE TYPE CAPACITOR MADE . .

Wiring Catalog (328)

Wiring devices manufactured by Arrow Electric division of the Arrow-Hart & Hegeman Electric Co. are listed and illustrated in catalog No. 27 just issued by the company. The listings bring up-to-date the complete Arrow line of wiring devices, including new goods. Eighty-eight pages cover such units as switches, sockets, receptacles for lamp or plugs, metal plates, plugs. Wiring diagrams are also included. Wiring devices manufactured by the Hart & Hegeman division of the Arrow-Hart & Hegeman Electric Co. are covered separately in catalog "X."

Terminals (329)

Streamlined gasketless terminals, Type SS, are the subject of a new bulletin issued by the General Cable Corp. This improved type of soldered-porcelain terminals are designed to be vacuum and pressure-tight in service, even under abnormal temperature and pressure conditions. This construction eliminates all gaskets and overcomes the problems associated with gasket leaks. A dissection of this particular unit is included.

Ground Relays (330)

Directional ground relays, current or potential, polarized for ground fault protection of lines are described in a 12-page G-E publication. Ratings and characteristics, connection diagrams, volt-ampere burdens are included. Construction and operation are completely covered.

Voltage Regulators (331)

A bulletin completely illustrating and describing their new streamlined three phase, AFR 5/8% step-feeder voltage regulators has been issued by Allis Chalmers Mfg. Co. It gives a thorough presentation of the step type unit, its construction, and the many novel features it includes for economy of operation and long life.

Pilot Relays (332)

Carrier-current pilot relays, type GMB, high-speed, for protection of three-phase transmission lines are ably described in a new 16-page General Electric publication. Features are briefed, and operation, application and characteristics pointed out. Many charts show time-current curves. Construction is outlined in every phase.

Weld Recorder (333)

Weld recorder for better spot-welded structures is discussed in a G-E pamphlet. The unit's construction, description and rating, operating speeds, conditions of sale are included in the 7-page presentation. This new recorder has been used for more than a year with spot welders in the production of aircraft and rail cars.

Heating Units (334)

Improved electric heating units and controls, designed to meet specific industrial applications for heating liquids, solids, and air, are covered in a new 38-page illustrated catalog issued by Westinghouse Electric & Mfg. Co. Each section contains information on the application of the units to particular industrial heating problems, and tables are listed throughout the catalog to assist in the proper selection of units to meet individual requirements.

IT HAPPENS EVERY DAY
ON SHIPMENTS FROM THE EAST
Shipments from the East leave daily for the West via NATIONAL fast, regular, dependable through service . . . combining truck and rail under one responsibility from source to your door.
NATIONAL
CARLOADING CORPORATION
Rail Wings on
FAST FREIGHT
OFFICES IN PRINCIPAL CITIES

NEW BOOKS

PRACTICAL ELECTRIC METERING, by M. F. Smalley, John Wiley, printer, $2.75. This book is intended as a text to be consulted by metermen and others who seek a better understanding of equipment used in their work. It starts with a group of chapters which review the fundamentals of electricity and then follows with chapters each of which deals with a separate type of meter. In an endeavor to appeal to all types of metermen, the book includes a great deal of fundamental theory and mathematics. Each subject is accompanied by a circuit diagram and accompanying mathematical and vector analyses.

ELECTRICAL COMMUNICATION, by Arthur Lemuel Albert, John Wiley and Son, Inc., $5.00. The distinction of this book is the completeness with which it covers every phase of electrical communication, both wire and wireless, both code and speech. This is the second, and considerably revised edition of one published in 1934, and in every department incorporates improvements in the science up to 1940. Rather than isolating the various types of communications, the book treats them as a whole in order to demonstrate their interrelations in providing the public with adequate communication service. It is intended as a college text book and as a reference for those in the communications industry.

THE MEASUREMENT OF ALTERNATING-CURRENT ENERGY, by Donald T. Canfield, McGraw-Hill Book Company, available at McGraw-Hill book room, 68 Post Street, $2.00. Canfield is an associate professor of electrical engineering at Purdue University, and his new book follows the success of one he published several years ago, entitled "Vector Representation for Electrical Meter Men." This new book on AC energy measurement does a thorough job of covering the fundamentals and answering such frequently asked questions as: How is metering torque produced, what metering scheme should be used in a particular circuit, how is one sure this will measure all the energy? The author has been successful in eliminating from the text such material as is customarily found in handbooks, and in so presenting the material as to make the book useful in utility training schools for metering men, and particularly for the leaders of such groups.

SAVE TIME! USE THIS COUPON

To keep posted, simply circle the items in which you are interested, cut out the coupon (it can be pasted on the back of a postcard) and mail to:

ELECTRICAL WEST, 68 Post St., San Francisco, California
Please send me the following CIRCLED items:

301	302	303	304	305	306	307	308	309	310
311	312	313	314	315	316	317	318	319	320
321	322	323	324	325	326	327	328	329	330
331	332	333	334						

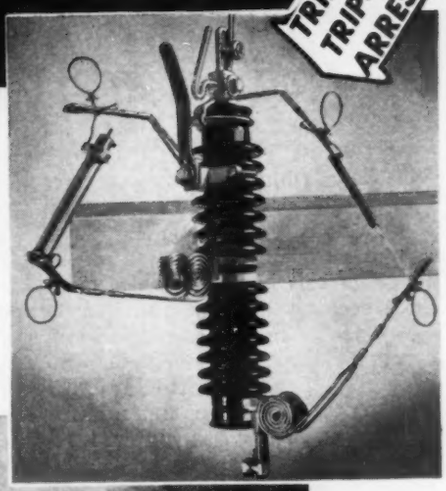
Name ..... Title* .....

Company* .....

Address .....

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

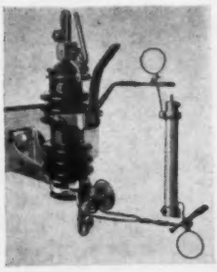
CHOOSE A MODERN KEARNEY *Lightning* ARRESTER FOR PRACTICAL PROTECTION AT LOW COST . . .



NOW — sound engineering design makes it possible to produce economical lightning arresters that afford protection against lightning and other surges — not from a function of arresting but — by providing a good path to ground at a sufficiently low potential not to exceed the safe value for the apparatus or line insulation. At the same time these arresters interrupt the follow current at normal voltage before damage to equipment or service outage occurs.

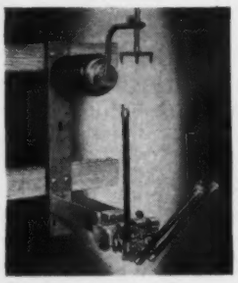
Shown here are some new departures and special features in arrester designs which have attracted the interest of alert operating men everywhere. Ask for further information and latest prices.

The TRIP-O-GAP

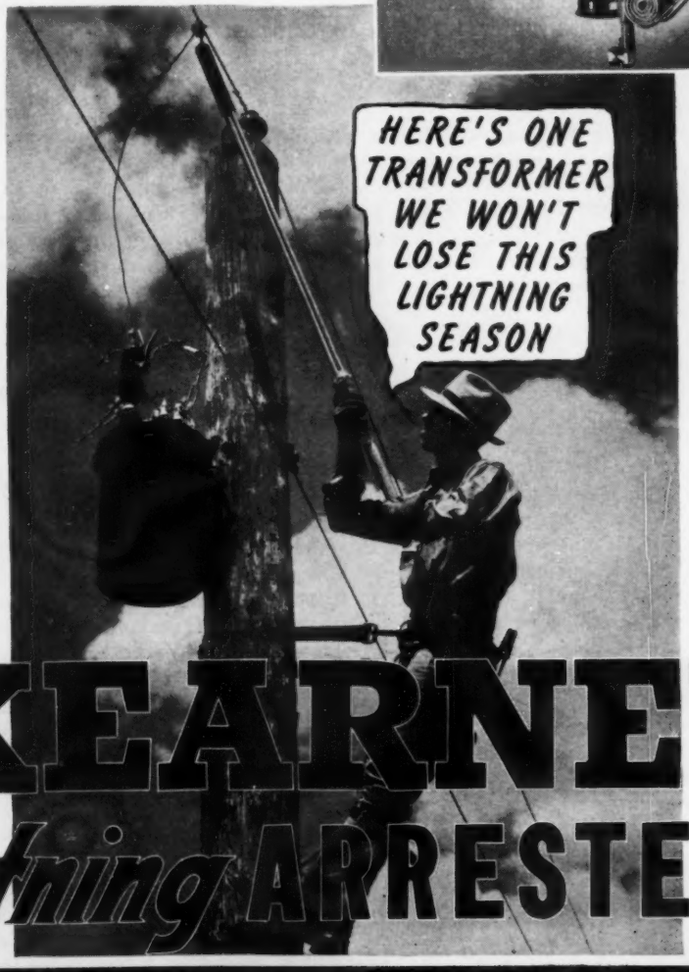


The Trip-O-Gap Arrester utilizes fast, de-ionizing action of horne fibre. Expulsion tubes have weather-resistant vitrified tubular shields. External air gap assures continuity of service and keeps potential off gap during normal operation.

Repeating Fused Gap Arrester



Here's a Kearney Fused Gap Arrester used to protect equipment at large stations and substations. An adjustable air gap provides exact degree of apparatus protection. Cartridges are fused with 5 ampere links to give a quick, positive low-resistant path to ground.



Use KEARNEY *Lightning* ARRESTERS

EXCLUSIVE SALES REPRESENTATIVES **MAYDWELL & HARTZELL** INCORPORATED

LOS ANGELES • SAN FRANCISCO • PORTLAND • SEATTLE • PHOENIX • RENO • TACOMA • SPOKANE

PRINT IN BINDING

ELECTRA'S HUSBAND

Scuttling the Ship

ONCE in a blue moon Electra goes out alone of an evening and leaves me with time for some sober and serious contemplation on the problems of this industry. This is one of those evenings and I'm prompted to harken back to an article reprinted in ELECTRICAL WEST a few months ago (having been first published in 1931) on "Who Pays the Reparations for Price Wars?" The gist, you will remember, was that a buyer who scuttles a seller's ship for an immediate price advantage, pays later for having destroyed an essential source of supply.

Although a utility man wrote the article and the big shots in all branches of the industry praised its spirit and text, I gather that utility policies are as changeable as Confucius' words—or memories are mighty short. Why? Because right now utility men both publicly and privately are demanding lower prices on major electrical appliances so that they can reduce sales resistances, open new markets, sell more appliances and boost load. Certainly the consumer movements have been spot-lighting price spreads, distribution costs, promotion expenses and every other factor which keeps retail prices above bare manufacturing costs.

I've been around enough to know that no utility man will take an indictment sitting down. When I accused a particularly vociferous price arguer of short sightedness in forcing down the base price of electric ranges, he reared up, indignant as a senator. "Don't be stupid," he said, in effect. "Here I force the manufacturers to do what they should have done before, but were afraid to do; I get lower prices and broaden the market for ranges so that they make more sales; I make it easier for customers to have electric cooking; I make it possible for dealers to sell the same range so they won't lose; I get electric range prices down so that they get more and more competitive with gas ranges, and consequently sell faster; I take the consumer-movement heat off the manufacturers, jobbers and dealers by showing that range prices are getting lower and lower. And you've got the gall to criticize me!"

Maybe he is right. But I don't think so. I believe that every time a utility forces the manufacturer to produce a "special" for wide promotion—at a "special" lower price—the utility is unwittingly undermining both the manufacturer and dealer. Whether it is a stripped range or a stripped refrigerator or any other appliance with some degree of customer acceptance and buying interest, the moment the utility begins to advertise that product at its special low price, all customers reached by that advertising become conditioned to lower prices. Because of its size and selfish interest in selling good appliances at the lowest reasonable price, the utility has become the standard against which all appliance merchandisers are compared.

Statistics prove that dealers get a higher average price for appliances than do utilities—or, turning this around to allow for the fact that dealers don't always get their price, the average appliance sold by dealers is higher in price than the average sold by utilities. Dealers make their profits out of selling up into the quality brackets, which carry a greater dollar margin.

But when an artificially low price is fixed in the public mind as the cost of a quality electric range, the dealer finds it more difficult to justify the cost differential between de luxe models and promotion special. As a result, he must work harder and spend more to make his profit, and the customer more often buys some stripped model which affords him no fair comparison in quality and service between electric and gas cooking.

And I can't give any points on that argument for getting prices down to meet gas ranges. If electric cooking hasn't some inherent advantages which are worth a fair difference in range costs, I'll eat my hat—or, better yet, the bundle of electric cookery ads I've written. Anyway, the gas industry cries, as it did in New York a few weeks back, "Look at the electric range. Let's get our prices and quality up to that level." We're not giving them much of a mark to shoot at with our present tactics.

Sure, the refrigerator people kept lowering prices and increasing sales. But they didn't try to compete with the ice box—at least, until this year. They spent a number of very profitable years just selling good electric refrigerators at a good price—and doing a pretty nice job of it.

Western utilities long ago learned that build-load-or-bust programs generally were busts, when it came to dealer and customer relations. A little bit of thought at this time should prevent a deluge of service complaints, customer dissatisfaction, dealer failures, chaotic markets, and profitless manufacturing.

I MENTIONED customer relations a few words back, and that recalls a couple of things picked up in the East in January. I was staying at the Statler in Boston and, during a particularly heated discussion of certain public figures, one of my guests brought his fist down too hard on the glass which topped the writing table. It broke. When I returned to the room before dinner next day, there was a big basket of fruit with the manager's card on top of a brand new glass in the table. Later, when I paid my bill, I found an item of $2.25 for broken glass but, remembering the fruit, my protest was only half-hearted.

I've been led to believe that hotel rates include a percentage to cover breakage and pilferage. Moreover, I don't think such expensive glass should be in a vulnerable place. But four bits worth of fruit, plus some thought, kept me from airing my views in the lobby, disturbing or frightening other guests; like many utility customers, I resented what I thought to be an unfair charge, but unlike many utility customers I was prevented from airing my grievance in public and preserving it in private.

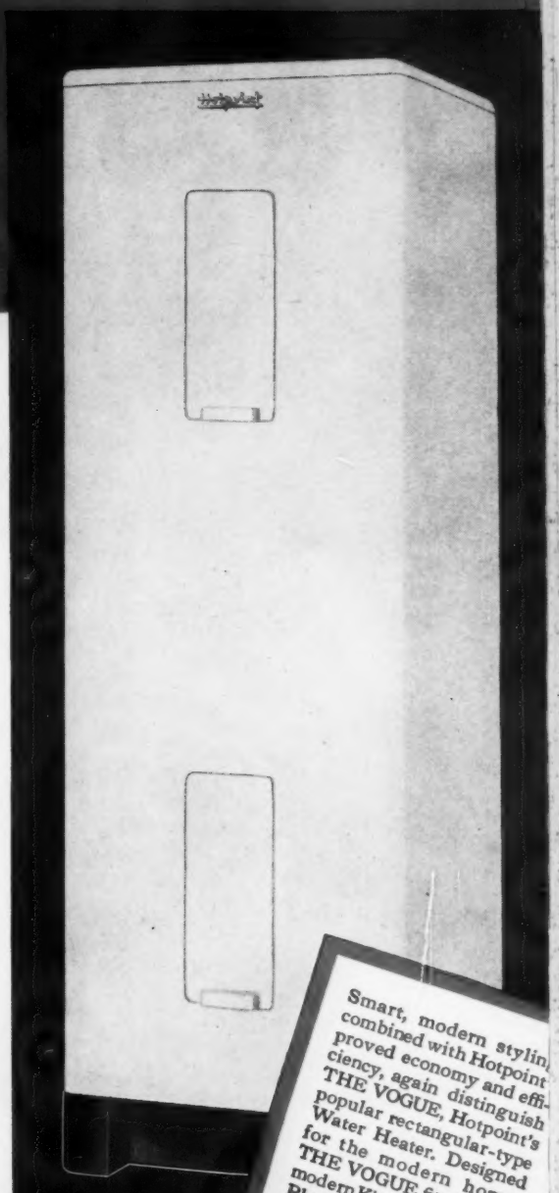
One of the persons I met on this trip was, of all things, a toilet paper salesman. Sounds silly, but his best sales argument is nothing so prosaic as coverage or cost. It is customer relations! For instance, he told me that the Waldorf-Astoria has been importing its comfort station accessory from London because they make it just a little softer and more fragrant over there. The vice-president in charge of those things at the Waldorf was sold this paper with the argument that even such an insignificant touch would not be overlooked by its patrons. Still sounds silly, does it? Well, I am told that the Waldorf keeps buying that paper because dozens of its patrons noticed the difference, liked it so well that they are buying it from the hotel for their own homes!

It's the little things that count.

ELECTRIC WATER HEATING IS ON THE MARCH

AND Hotpoint LEADS THE PARADE

DON'T be a straggler—get out there in front now for your share of the rich market that awaits active, alert promotion of modern Hotpoint Electric Water Heating. Never have conditions been so exactly right for reaping big profits from electric water heating . . . and never has Hotpoint, leader in Electric Water Heater Sales, given you such a complete and beautifully styled line, backed by such a well-rounded sales promotion program. Mark this well —*1940 is going to be the greatest year in the history of Electric Water Heating.* Plan now to cash in with Hotpoint Automatic Electric Water Heaters.

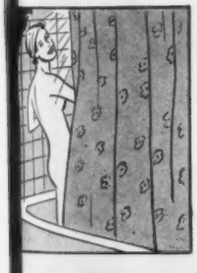


Smart, modern styling combined with Hotpoint proved economy and efficiency, again distinguish THE VOGUE, Hotpoint's popular rectangular-type Water Heater. Designed for the modern home, THE VOGUE fits into the modern Kitchen, Basement Playroom or Bathroom.

There Is More Water Heater Sales Activity Than Ever Before In History!

MORE BUILDING ACTIVITY—New homes are rising by the thousands. Additional thousands of homes are being modernized. Each new home—each modernized home is a prospect for modern Hotpoint Automatic Electric Water Heating.

MORE INTEREST BY UTILITY EXECUTIVES—In every section of the country utility leaders are planning electric water heater sales campaigns. The Modern Kitchen Bureau is conducting a National Program to promote Electric Water Heating.



MORE PEOPLE RECOGNIZE ADVANTAGES—In modern homes, men, women and children use, and praise, the dependable modern convenience of Hotpoint "hot water at the turn of the faucet." They're spreading the word—creating new customers every day.

MORE WIRED HOMES—This year, there are thousands of new homes being built—thousands more being modernized and wired. The market is ready-made for active cultivation—and profit.

HOTPOINT IS FIRST IN . . .

NATIONAL ADVERTISING—Millions of people who are planning to modernize their present homes, or to build new ones—your best market—will read Hotpoint's national advertising every month of 1940 in *American Home* and *Better Homes and Gardens.* Hotpoint is the first manufacturer to give you national consumer advertising on water heating exclusively.

SALES AIDS—Hotpoint again gives you every help to profitable selling—colorful sales folders, broadsides, booklets, window and floor displays and sales training program and material which win prospects. Ask your Hotpoint distributor or district representative.

SALES PROMOTION—Complete plans, contest material and ideas for promoting successful sales campaign are available. They're yours for the asking. See your Hotpoint representative.

OUTDOOR ADVERTISING—Colorful posters, with space for imprinting your name and address, are available for display in your sales area. They tell the story of the safety, convenience and dependability of Hotpoint Electric Water Heating to every passerby.

EDISON GENERAL ELECTRIC APPLIANCE CO., INC., 5612 WEST TAYLOR STREET, CHICAGO, ILLINOIS

WATER Hotpoint HEATERS

ELECTRIC RANGES • REFRIGERATORS • WASHERS AND IRONERS • CLOTHES DRYER • DISHWASHER-SINKS

A GREAT NEW RANGE

THAT LOOKS AND PERFORMS LIKE MANY UNITS COSTING $50 MORE.

Here's the latest addition to the Norge line of electric ranges—a range with such a wealth of eye-appeal that it steps right out of its price class and makes hot competition for units costing $50 more. But its value as a "shopper-stopper" doesn't end there. For, it's packed with features that make first-class, hard-hitting, order-getting sales material—just look at the list and ask yourself when you've seen any low-priced range that compared with it in size, equipment and quality features of construction! This is the kind of product that salesmen are proud to sell because it has plenty worth talking about—and worthy of the prospect's attention and interest. And despite its low price, it is a full profit item for you and is backed by the name and reputation of the Borg-Warner Corporation. Other big-value models for every budget.

NORGE DIVISION BORG-WARNER CORPORATION,
DETROIT, MICHIGAN

In Canada: Canadian Radio Corporation, Fleet Street, Toronto
Royal Rollator Refrigeration • Electric and Gas Ranges • Washers and Ironers
Commercial Refrigeration

★ Investigate the *complete* line of Norge appliances . . . the opportunity for profit from matched unit sales.

Features THAT SING TO THE PROSPECT'S POCKET BOOK

1. **BIG DIVIDED COOKING TOP,** two inches longer than usual, gives maximum work space in the center.
2. **FOUR TOP ELEMENTS**—1-2000 w. power-speed element for speed cooking; 3-1200 w. closed elements.
3. **NEW SIX-HEAT SWITCHES** mounted on backrail.
4. **TWO LIGHTED SIGNAL INDICATORS** on backrail, one for oven, one for top elements.
5. **CONVENIENCE OUTLET** on backrail.
6. **"BROIL-EVEN" OVEN,** sealed bottom, two elements totaling 3940 w. for preheating and 2370 w. for baking. Performance equalling ovens with much higher wattage.
7. **HIGH-SPEED BROILER,** waist-high, easy to use.
8. **OVEN HEAT CONTROL** with pre-heat, bake and broil switch.
9. **TWO-LIGHT OVEN HEAT INDICATOR.**
10. **TOP OVEN VENT** prevents wall soil.
11. **FULL 20-INCH OVEN TAKES LARGEST ROASTER** (No. 5 Lisk).
12. **COMBINATION BROILING and ROASTING PAN** standard equipment.
13. **TWO OVEN RACKS** with stops, non-tilting but easily removed.
14. **OVEN RACK SLIDES** integral with lining.
15. **ONE-PIECE OVEN LINING,** porcelain enamel for instant cleaning.
16. **FULL ROCK WOOL INSULATION** for economy and comfort.
17. **BIG STORAGE COMPARTMENT** to left of oven.
18. **INTEGRAL RECESSED BASE** fits close to wall.
19. **RECESSED FRONT** for toe room.
20. **BEAUTIFUL NEW DESIGN** with monogram nameplate in white and gold enamel.
21. **BEAUTIFUL REFRIGERATOR PORCELAIN ENAMEL FINISH.**
22. **SPARKLING CHROMIUM TRIM.**
23. **WELL TYPE COOKER** available at low extra cost for extra economy in cooking soups, cereals, and for deep fat frying.
24. **LAMP and AUTOMATIC TIME CONTROL CLOCK** at small additional cost. Range wired to receive lamp and clock which can be attached by anyone in a few minutes.
25. **Backed by the reputation and resources of the Borg-Warner Corporation,** of which Norge is a Division.

_____ 1940

NORGE DIVISION
BORG-WARNER CORPORATION
670 E. WOODBRIDGE STREET,
DETROIT, MICH.

RUSH ME DETAILS of Norge 1940 Electric Range line. No obligation, of course.

Name _____

Firm _____

Address _____

City _____ State _____

EW-100

SEND THE COUPON FOR FULL DETAILS ABOUT THE

New 1940 **NORGE ELECTRIC RANGE**

School for Stockholders

The Washington Water Power Co. Tell Its Story in a Series of Educational Meetings

FAVORABLE public opinion is a vital asset to any business. Particularly is this true of an electric utility, which by the very nature of its operations touches the lives of so many people. With the exception of the actual utility personnel, no group is more strategically situated to mould and influence public opinion than the stockholders. They constitute a body of influential and substantial citizenry which has a vital and personal interest in the welfare of the organization in which their savings are invested.

FRANK POST

As part of a coordinated program of goodwill-building, The Washington Water Power Co., has been conducting a series of group meetings for its preferred stockholders in Spokane. Since their inauguration last fall the meetings have attracted over 800 stockholders who have become acquainted with the problems and progress of the company throughout its territory. Twenty meetings have been held.

Attendance is by invitation. Initially the list of local stockholders was divided into alphabetical groups and a personal letter of invitation signed by President K. M. Robinson addressed to one group prior to each meeting with a reply card enclosed. There was also a telephone follow-up just prior to each meeting. The names of those unable to attend were placed in the group scheduled to be invited to the next meeting.

Each of the 20 meetings, at which attendance averaged in excess of 40. followed the same general plan. The program opened with the showing of a half-hour version of the company's motion picture, "The Story of Electric Service." This movie graphically portrays the operations of a large electric utility system. It was planned as an educational subject and deals with The Washington Water Power Co., its plants, personnel, operations and customers. It is distinctly free from commercialism. Following the showing of the picture, Frank T. Post, former president of the company and now a member of the board of directors, addresses the meeting in an intimate, personal fashion, discussing the company's operating problems.

The meetings are held in the company's auditorium. Adjacent are the home service department's test kitchens. At the conclusion of each meeting, members of the home service staff serve refreshments which have been prepared in the kitchens.

Thus far the stockholders' meetings have aroused considerable favorable comment and have resulted in a closer understanding between the company and its local investors. The motion picture shown at the meetings was made on the company's properties from a scenario and script prepared by E. J. Crosby, Jr. A professional photographer did the shooting. Two versions were printed—one running a full hour and the second a half hour. To date these pictures have been shown to more than 80,000 people residing in the territory served. They have been shown before all types of clubs, in schools and even as a part of the program in some of the motion picture theaters.

A final feature of the company's educational activities includes an employees' program. This consists of a series of 10 lessons each dealing with some phase of the company's operations. Each employee attended an hour's class every two weeks for 20 weeks, each class being composed of about 30 people with an instructor and secretary. Prepared lessons were read, with a full "round table discussion" by members of the group. Sole function of the instructor was to assist in the discussion. Questions brought up were recorded by the secretary and answers were brought in at the next meeting. A total of 1,692 employees of the company and its subsidiaries attended the series of classes, all on company time.

Sample "stills" from the excellent motion picture, "The Story of Electric Service," produced by Washington Water Power

Water Heaters - Ranges - Refrigerators

Electrical West *Investigates Major Appliance Field*
and Summarizes the Various Viewpoints of Experts

MAJOR appliances represent big business to the electrical industry here in the far West. They contribute heavily to the revenues, high consumption and low rates of the utilities. Their aggregate sales volume is an important item to manufacturer, distributor and retailer. The installation work adds to the volume of the contractors.

Hence trends, market conditions, new developments, aggravating problems, changes in policies and competition are factors of interest to every branch of the industry. Annually ELECTRICAL WEST investigates the major appliance situation. This year inquiries were directed to two-score dealers, utility men, distributors and manufacturers, who by experience and achievement qualify as experts in this field. Their frank opinions were solicited and they have spoken freely because their identities have been kept confidential.

What is the immediate and long-term viewpoint of these experts on the range, water heater and refrigerator situation? Their comments are summarized and interpreted in what follows.

Standardization of Models

LONG lines have been an evil of the appliance business. There have been too many models for real profit for manufacturer, distributor or retailer. And the utilities have contributed to the difficulty with their specifications, rate forms and special requirements for approval.

Today the whole industry is conscious of the benefits that will come with standardization. But there is a long road ahead before the ultimate goal will be reached. Here's what some of the experts say about the situation:

"I favor standardization in the low-priced field. However, there will always be a market for appliances that have individuality and style."

"Water heater standardization will never be possible as long as the rate picture is guided by engineers who are so far away from the commercial department viewpoint."

"Standardization is necessary if profits are to be made with present prices and discounts."

"Reduction in the number of models cannot help but benefit everyone—manufacturer, distributor, dealer and customer."

"The tendency of manufacturers to produce fewer models and thus reduce costs will be a big factor in our expected 8 to 10% increase in sales as compared to 1939."

"We are convinced that many manufacturers can afford to shorten their lines and concentrate on quality and design. The trend toward planned home construction makes standardization most desirable. Then there is the future problem of replacement parts."

Utilities' Responsibilities

NOT so many years ago there was an almost universal hue and cry for the utilities to get out of the merchandising business completely. A lot did, and now wish they hadn't. So do some of the dealers (speaking confidentially) in the territories where that happened. One of the sanest and soundest definitions of the utility's responsibility is that given below (and it was not written by a utility man either):

"It is the utility's obligation continually to promote better understanding between all branches of the industry, harmonizing their aims into a merchandising service which will result in better satisfied customers and more profit to dealers, jobbers, manufacturers and to the utility itself. Not only should they carry on pioneering, educational, advertising and promotional activities, but they must constantly introduce new selling plans and disseminate new merchandising ideas. In addition utilities should assume the leadership in directing sound, constructive, ethical merchandising of those products which consume electric energy. This should be done in a manner calculated to encourage the aggressive activity of all dealers handling appliances."

"Our 1940 program will include a dealer promotional organization which will cooperate with dealers in sponsoring industry-wide campaigns on all electrical equipment. We hope to assist the dealer in sales training and in generally acquainting him with a sound sales story based on the advantages of electric service."

"There are still places where utility salesmen's remuneration is the cause for much trouble. If the salesman is paid a commission on merchandise volume rather than EAR or load added, the utility suffers and so do the dealers. If a range sells for $175 and a water heater for $75, and it takes in addition twice as long to sell a water heater, which will go into the customer's home?"

"Experience shows that it still takes an average of five calls by the salesman to induce the average housewife to buy a range or a water heater. If we can save three of these calls by inducing the housewife to come into the dealer's store to hear a complete sales story, every one will be ahead."

"We still believe that the utility has to do an aggressive selling job, coordinate the installation problem, carry the burden of advertising and promotion, assist in financing and service the product after it is in the home."

Discounts

THE OPINION has been freely expressed that dealers could not profitably sell ranges and water heaters with existing discounts. Strangely dealers themselves do not concur. So long as the utilities and manufacturers carry the advertising and promotion burden, dealers seems satisfied. Recent refrigerator price reductions however, have caused a lot of speculation. Will additional volume offset reduced margins? A lot of people don't think so. Generally it would appear as though the discount question is not as serious as it has been.

"Increased discounts are unnecessary at present, and might make it even more difficult to solve the trade-in problem."

"With prices declining and margins becoming slimmer, it is more necessary than ever to obtain full prices. Price wars and discounts do nobody good."

"Present discounts are satisfactory **provided** the manufacturers continue their advertising programs to secure further customer acceptance."

"Trick deals, even though the manufacturer may temporarily benefit from them . . . sooner or later will result in organized group effort to make capital from such practices."

Range, Water Heater and Refrigerator Data for Western Systems—January, 1940

SYSTEM	Domestic Customers	Av. Annual Dom. Con. '39	Saturation (%) Ranges	Water Htrs.	Refrig.	Ranges 1939 Sales	Ranges 1940 Quotas	% Rplmt.	Water Heaters 1939 Sales	Water Heaters 1940 Quotas	% Rplmt.	Refrigerators 1939 Sales	Refrigerators 1940 Quotas	% Rplmt.
Alameda, City of	10,703	1,023	*	*	*	172	200	*	24	40	*	199	250	*
B. C. Elec. Ry. Co., Vancouver	90,000	1,025	14	3	12.5	934	935	25	102	110	10	1,892	2,010	4
B. C. Elec. Ry. Co., Victoria	19 000	806	*	*	*	140	162	*	23	18	*	405	425	*
Burbank, City of	10,028	850	10	4	*	395	500	10	75	200	*	*	*	*
Calif.-Oregon Pwr.	28,300	2,250	43	21	*	1,571	1,800	6.6	1,240	1,500	3	*	*	*
Central Ariz. Lt. & Pwr.	25,461	1,038	*	*	*	181	225	10	63	75	*	2,210	2,300	40
Coast Counties G. & E.	19,978	791	*	*	*	50	60	*	100	75	*	*	*	*
East Oregon Lt. & Pwr.	6,320	910	30	8	62	192	250	15	81	200	*	483	500	25
El Paso Elec.	21,139	1,120	18	13.7	63.5	306	350	2	264	300	1	1,412	2,035	7.5
Glendale, City of	24,300	1,010	11	1.3	35	306	325	*	41	70	*	*	*	*
Idaho Power	52,683	1,835	55	25	55	3,550	3,540	35	1,683	1,700	10	4,841	4,840	13
Los Angeles Bur. P. & L.	396,000	900	5.4	1.8	55	6,500	7,500	3	2,500	4,000	*	50,000	65,000	50
Montana Power	69,000	870	20	*	50	1,282	1,863	20	171	343	*	5,992	7,012	5
Mountain States Pwr.	49,200	1,280	*	*	*	1,407	1,400	22.5	496	500	*	3,593	3,500	9.2
Northwestern Elec.	31,520	1,421	41.1	7.4	55	1,663	2,100	25	469	815	5	3,429	3 220	13
Pacific G. & Elec.	684,256	985	9	5	40	3,897	4,865	*	2,971	3,220	*	46,406	51,045	20
Pacific Pwr. & Lt.	56,700	1,606	17.2	11.2	36	1,961	2,122	20	1,281	1,311	4	6,053	6,580	15
Pasadena, City of	27,554	986	4.5	2.1	62	205	300	*	106	150	2.1	1,800	1,500	*
Portland Gen. Elec.	120,500	1,380	26	8	51	4,450	5,050	16	1,950	2,600	3	5,300	5,500	5
Pub. Ser. of Colo.	112,270	700	5.5	*	51	591†	600†	5	109†	125†	*	1,724†	2,000†	10
Puget Sound Pwr. & Lt.	172,450	1,391	28	12	36	5,509	5,600	36.4	2,929	3,400	8.7	10,716	10,880	5.9
San Diego Con. G. & E.	77,346	954	*	*	*	530	600	*	475	600	*	8,100	8,000	*
San Joaquin Pwr. P. G. & E.	96,500	1,270	15	8	72	1,379	1,550	18	732	850	6	6,897	7,000	8
Seattle, City of	81,000	1,490	46	28	*	3,561	4,500	27	1,614	2,000	*	*	*	*
Sierra Pacific Pwr.	11,800	1,466	55.6	16.1	67.4	894	1,000	14.9	280	300	5.1	1,101	1,200	34.9
Southern Calif. Edison	433,800	977	9.5	4	60	4,723	5,000	17	1,444	1,600	11	35,893	35,000	10
Southern Colo. Pwr.	21,657	883	21	5	40	460	540	10	161	200	1	2,012	2,100	15
Tacoma, City of	32,325	1,900	39	35	*	1,500	1,750	40	600	725	27	*	*	*
Tucson G. E. Lt. & Pwr.	14,116	932	10	3	70	150	150	10	50	50	10	1,500	1,500	15
Utah Pwr. & Lt.	104,346	1,140	38	6	60	3,493	3,850	30	990	1,060	5	9,444	10,100	25
Washington Water Pwr.	68,631	2,060	35	25	30	2,601	3,600	45	2,432	3,000	20	7,473	7,830	30

All figures for sales and quotas are company-dealer totals except where indicated by dagger (†).
* Figures not available.

Here in the proverbial nutshell is the picture of the range, refrigerator and water heater situation as it applies to the systems of the major utilities, both private and municipal, in the Western states. The systems represent 93% of all farm and residential customers in the area. Figures show that 1940 range, refrigerator and water quotas represent increases over 1939 sales of 10.4%, 9.5% and 16.4% respectively. Incidentally the refrigerator estimates were compiled before the recent price reductions so that total 1940 sales may be greater. Saturation figures show a wide variation and the percentage of replacements is naturally higher where saturations are greatest. Average annual consumption also follows saturation, being greatest where saturations are highest, except for those companies which have numbers of flat rate water heaters on their lines. Unfortunately not all systems have records which permit calculation of saturation percentages in utility territory

Low-Income Customer

CAN the low-income customer be induced to buy major appliances? Opinion varies. Some think that this group will solve the trade-in problem by absorbing re-conditioned equipment. Chain stores are helping with their low priced merchandise. It is generally agreed that this customer requires special sales effort on the part of the utility.

"Lowering of rates is not nearly so important a factor in getting customers in the lower income brackets to use electrical equipment as is the first cost and the cost of installing the equipment."

"As trade-ins become increasingly important, there will be an opportunity to recondition much of this equipment and sell it to the low-income customer. Look at the automobile business—three used car sales for every new car."

"When a chain store advertises a 6-ft. refrigerator for $88, we would say that it is opening a new bracket of purchasers in the low-income groups."

"We are going to experiment . . ."

"The dealer makes no effort to call on low-income or low-use customers, so if these customers are to receive any selling, it behooves the utility sales organization to make the calls."

"The utility should carry a line of merchandise within the range of the pocketbooks of this group. This merchandise should be sold by house-to-house contact and not displayed and priced on the sales floor."

Trade-in Allowances

AS SATURATIONS increase, so does the problem of trade-ins become more and more perplexing. Witness what has happened in the automobile and radio industries. The table that accompanies this study shows that the refrigerator business in many terrtories is now confronted with a real problem, with replacement sales running as high as 40%. One evil has been to use the trade-in allowance as a means of price-cutting. Possible remedy is a "Blue Book" like car dealers use. Another is the setting up of a centralized appraisal and re-conditioning bureau. Some pertinent comments follow:

"As the number of dealers stocking and selling electric ranges increases, the matter of unnecessarily large trade-in allowances solves itself. Dealers soon learn that to make the business profitable, excessive allowances must cease."

"As saturation increases, it becomes more difficult to keep trade-ins reflecting a true value rather than a price concession. . . . The industry should band together and embrace a standardized trade-in policy as the automobile people have done."

"We are definitely opposed to trade-in allowances as a means of subsidizing sales."

"The trade-in should be determined by the value of the article being turned in."

"Unless allowances are standardized, the dealers will have their profits tied up in second hand equipment . . . and go broke."

Wiring Alllowances

"BUG-A-BOO" of the range and water heater situation is the matter of installation cost, except in those areas where saturation and customer acceptance are high. There have been all kinds of panaceas proposed and tested. Opinion is still divided as to whether wiring allowances should be given by the utility as a form of subsidy. Dealers and distributors in territories where competition is keen say "Yes." Some utilities do, others do not. It appears that local conditions will dictate what policy is adopted.

"With existing low rates and increas-

ing efficiency of appliances, present revenues will not justify free wiring."

"Wiring allowances offer only a temporary inducement. What is needed is wider public acceptance and this can best be accomplishd by telling the electric cooking story often and well with persistent advertising, with trained salesmen and expert home economists."

"We are definitely opposed to any form of subsidy."

"If the wiring problem can be corrected so that the merchant does not have to concern himself with either the physical or the financial aspects of it, he will be eager to enter the range and water heater business."

"The only possible way to sell ranges is to quote them **installed** to the customer; otherwise two sales are involved and the mortality rate on this type of sale is high. On new homes where speculative builders have the say, a colossal amount of selling is involved (much of which must fall to the utility) to get range circuits installed."

"Wiring allowances were unquestionably necessary during the pioneering period. Now it appears that with high saturations and with the market limited to rented homes among the low income brackets, it may be desirable for the utility to again cover part or all of the installation expense."

Chain Stores

"OPPORTUNISTS," cry some dealers about the chain stores. "Among our best cooperators," say some utility men. All agree that they are smart merchandisers, and that they are reachng a segment of the market that hitherto did not buy many appliances. However, one dealer made this significant comment: "I'm not worried about Sears or M-W. These consumer cooperatives are the thing I fear. They've started a couple on REA's and they look bad." He's right. But here's what others think:

"Activities of chain stores, whether we like to admit it or not, have materially reduced the prices of appliances and at least placed some models within the reach of many customers who formerly could not afford to purchase such equipment."

"Chain store competition does affect the dealer. However, we hope that our program of assistance and cooperation will help the average dealer to secure his share of the business."

"We only wish that other retail outlets were as active and aggressive as the chain stores with which we have had experience."

"The chain stores never sell much of anything until the saturation gets up around 25%."

"OLD KING COLE IS A MERRIER SOUL.
SINCE THEY CHANGED TO ELECTRIC COOKING;
SO QUICK AND CLEAN, THAT KING COLE'S QUEEN,
IS EVEN BETTER LOOKING!"
LESS WORK TO DO with Electric COOKING

Jingles such as the one on this Modern Kitchen Bureau cartoon advertisement are part of a big 1940 drive to "sell" housewives electric cooking

"We all deplore the fact that the chain store contributes very little to the appliance sales game except a low price. However, this low price may help to get the remainder of the dealers to tell a quality story."

Competition

HOW tough is the competition? Answer to that depends upon the region from which the speaker comes. In California, where high B. t. u. natural gas is abundant, there is plenty of hollering about competition. And there is veiled criticism of the combination companies which try to be neutral. In rural areas of central and northern California, butane or bottled gas has made quiet but serious inroads on the electric business. The national promotion put back of the "CP" range by the gas industry, financed by a per-meter assessment on the gas utilities, brought forth the question, "Why don't the electric utilities do that too?" Well, why not?

"The answer to competition lies in having range and water heater customers so satisfied with our service that they would never consider switching to some other method. We concur with the adage that 'a satisfied customer is the best form of advertising.' "

"In meeting competition we still feel that the heating plant in the home is the key appliance, influencing both water heating and the equipment in the kitchen. Consequently we still intend to promote the sale of automatic heat with coal."

"Competition in the form of bottled gas has cost the electrical industry in one rural territory $5,000,000 in lost business during the last few years."

"The combination company makes its own competition. By attempting to be impartial it opens the door to the salesman of bottled gas."

"The aggressive merchandising activities in territories served by natural gas make it difficult for the electric range to enjoy even a mediocre percentage of the business. Electric ranges and water heaters will never come into their own until retail dealers become interested in marketing the product."

Place of the Dealer

BETWEEN 75 and 90% of all appliances are being sold by the dealer. In the last five years the dealer has taken over much of the range business and an increasing proportion of the water heater volume. Most of this has been in those territories where public acceptance, built up by years of utility pioneering, has been greatest. Can the dealer do the whole job today? Few people, including dealers themselves, think so. Particularly is this true in regions where competition is keenest and where public demand is not great.

"Industry-wide cooperative effort is the thing that will popularize electrical appliances. Obtaining the help of the retailer and then training his sales personnel are among the most important items in promoting range and water heater sales."

"Appliances must be easy to sell and profitable to the merchant in order to attract his interest to this business."

"Manufacturer, distributor and the utility must work together to make this business profitable for the dealer. When this is done the retailer will do the rest. He's demonstrated his ability with refrigerators and laundry equipment."

"The dealers, with utility help, can sell all of the ranges, refrigerators and other appliances. Our only direct activity will be on water heaters."

"While approximately 90% of all appliances in our territory is sold by dealers, we still believe that the utility should be active in the sale and promotion of all electrical services."

"Ranges, in fact almost all electrical appliances, are still in the specialty class and have to be sold. This takes well-trained competent salesmen and these fellows can make more money in other lines of endeavor. . . . The solution for the dealer is to take space in a store that already commands customer traffic where his overhead costs can be diluted and he gains the prestige of being in the middle of things rather than on a side street."

ELECTRICAL WEST gratefully acknowledges the help it received from the many individuals who contributed to this review. Many of the opinions are divergent. But then the subject matter is controversial. If there was general agreement on all of the points raised, every home in the West would have an all-electric kitchen.

This Refrigerator Price War—A Boomerang or Boom?

By W. A. Cyr

REFRIGERATOR prices—they are the topic of the day among dealers everywhere. Since the first break in prices last month, all the makes have sent their prices and margins into a toboggan, the end of which is not yet clearly visible. But aside from this the prospect for business in appliances is brighter this spring than it has been in years. And even refrigerator prices are looked upon by many dealers as a step in the right direction.

A tour of the Northwest for a series of dealer meetings has given me an opportunity to talk to dealers, their salesmen, to distributors' men and to utility sales people. Soon the conversation swings around to the new price war on refrigerators. And opinions are varied. Some of these are worth a quick review. There are ideas that might well be used by others in far removed communities.

Pocatello, Idaho was the first stop. Last year this division of Idaho Power with dealer help knocked that idea of a decline in small appliance sales into the sagebrush. This division recorded the highest kw.-hr. use per domestic customer, and chiefly because of small appliance sales to low income users. In December alons there were 405 appliances sold for a total of $3,762.13, or $9.29 per customer in the division. Steve Rhodes, division sales manager, is proud of dealers and sales personnel for that record.

E. W. Hale, with confidence of good business ahead, remodeled and enlarged his Pocatello Electric Supply Co. With a bigger stock of Frigidaires he seemed to feel that the refrigerator prices were all right if he could continue to sell in volume.

W. H. HARBERTS

Twin Falls dealers, with a good record of sales for 1939, were inclined to wonder if the new prices on refrigerators would really bring enough volume to offset the lower margin and the lower gross from which to derive the margin.

Nampa has a go-getting contractor dealer, that rare combination of contractor and salesman, in the person of W. H. Harberts, owner of City Electric Co. Into a new and larger store he moved in December, and has been selling his Hotpoint display merchandise right out of the store so fast he can't keep stock. A believer in the future of fluorescent lighting he uses it in his windows and was waiting for some new fixtures to light the store the same way. His enthusiasm for this lighting has helped him sell several commercial jobs in which the intensities are up to 35 ft.-candles and the customer wants more.

CLARENCE PURKHISER & SONS

The Purkhisers—father and sons, run a progressive and cheerful establishment in Caldwell. Clarence D. Purkhiser is president of the Electrical Equipment Sales Assn. of Idaho. Sons Clarence, Jr. and Herman are in the business now, too. Lighting and wiring are their main interest.

At Boise, Ralph Gale, general sales manager of Idaho Power was of the opinion that if the new margins and prices did not provide for sufficient reserve for manufacturers to maintain stocks of repair and replacement parts for several years, the entire movement was unhealthy and would bounce with future trouble. Down in Salt Lake City W. A. Huckins, general sales manager of Utah Power & Light Co. could not feel that the price drop would benefit anybody. "The dealer has to make money," he was emphatic in saying. "If he can't make money selling this merchandise he will lose interest." He also felt that in the long run, not many more refrigerators would be sold.

Two things can happen, was the thought of Hollingsworth, manager of the appliance department of Auerbachs department store, Salt Lake City. The price war may cause department stores to seek a private brand with which they can get a longer discount, or they may decide not to handle refrigerators at all. The department overhead is such, he pointed out, that unprofitable lines are

REED SMITH

soon eliminated. Electric ranges have suffered from that situation. Refrigerators may do likewise.

At Pueblo, Colo., Fred Voss, manager of the appliance department of Philips Music Co., and president of the Pueblo league, felt that the new price levels were a good thing, that mass production should have brought reductions much earlier. Trade-ins, he pointed out, would have to be cut to nothing and whatever old models were taken in, would have to be resold at a profit, because the margins would not permit taking any loss.

At Casper, Wyo., E. Johns, sales manager Northwestern Auto Supply Co., of Billings, Mont., Frigidaire distributors, was staging a Frigidaire dealer school. He declared that the reaction to the price cut had been enthusiastic in his territory.

Schoss-Reed Electric Co. of Ogden will plug away to sell up and sell more, said Fred Schoss. With years of selling experience back of his strong four-man crew, and a new and stimulating compensation plan for his staff, he feels that the salvation to the problem is to sell up. Reed Smith, manager of the Smith Appliance Co., in the J. C. Penney Co. basement, was enthusiastic over the new low prices as an aid to getting more of the business lost to the chains because of the great price differential existing in previous years.

H. L. Stiff Furniture Co., a dealer in Salem, Ore., cooperating with the Portland General Electric Co. in the promotion of electric ranges and water heater sales, won a national award with this double-barreled window display of not so modern (top picture) and modern kitchen equipment (bottom picture). Dealers not only use their own store windows for clever and sales-building displays like these, but are invited to use display space in the utility's own offices as well. Effective handling of the "before and after" theme in these windows combined humor with intelligent showmanship

New Dealers Build New Loads For Portland General Electric

By James A. Polhemus*

BETTER trade relations, with increased sales volume at lesser cost, seems to sum up the results of the first year's experience of the Portland General Electric Co. in a truly cooperative dealer-utility load building program.

The dealer cooperative plan now in effect upon our system is the result of studies and observations of the load building programs of scores of utilities on the Pacific Coast, along the Atlantic seaboard and in the southern states made during the last two years. Calls were made not only at the main offices of the utilities, but at the stores and offices of merchants selling electrical appliances. Generally speaking the most successful results were obtained where the utility stressed some form of dealer cooperation. Many of these dealer cooperative plans were just recently inaugurated, while others have been in effect for a number of years. One of the oldest (and also most successful) of the dealer cooperative plans has been in effect since 1932 on the system of the Sierra Pacific Power Co. This plan was finally adapted to fit our conditions.

Discussions indicated the necessity for the Portland General Electric Co. to discontinue direct merchandising; and hence the first step was to establish a sales plan for the company's own salesmen designed to remove quickly the utility from the merchandising field, and to build up dealer sales organizations to sell major electric appliances. This sales plan placed the company's salesmen upon a straight salary plus automobile allowance. Each salesman's salary was to be adjusted at six month intervals according to the percentage of accomplishment of quota assigned to him.

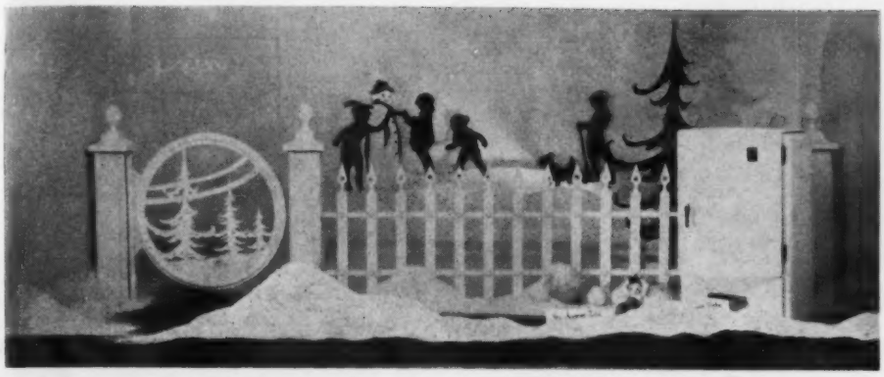
Quotas Established

Quotas were established on the theory that salary and automobile allowances for each salesman should not exceed a given percentage of the estimated annual revenue accruing from the sale of electric ranges and electric water heaters within the territory assigned to that salesman. The quotas for the first six months were based on 30% of the anticipated revenue. (Future quotas will revise this figure downward).

In other words, the salesman's compensation should not exceed 30c per dollar of E.A.R. On our system electric ranges are considered to bring an annual revenue of $24, while electric water heaters are estimated to bring an annual revenue of $30. These revenues were reduced to points to avoid dealing in large numbers, and to allow some flexibility; i.e., four points for an electric range and five points for an electric water heater.

To swing quickly the merchandising of electric appliances into the hands of the dealers and to overcome the very natural desire of our own salesmen to sell directly to the customer, one less point credit was granted on company sales. For example, a dealer sale of an electric range would yield four points, one-third more than the three points a direct company sale would give the salesman. Needless to say, with a prem-

* President, Portland General Electric Co.



Author of this striking refrigerator window display was Powers Furniture Co. in Portland. It is typical of the originality exercised in window displays of major electric appliances by this dealer and scores of others in the territory of the Portland General Electric Co.

ium on dealer sales our salesmen were quick to turn all possible business over to the dealers. All sales for which our salesmen request credit are checked against the company's "connect" records. Each division manager is required to approve the salesman's request for load credit, and in so doing accepts the responsibility of certifying that the new load has been connected to the lines.

Having developed a satisfactory solution for its own sales personnel the company next approached the dealers through a series of dinner meetings—one meeting in each division. It was first planned to put the cooperative plan in effect in one division at a time, but conditions were later found more favorable to launching the program in six divisions simultaneously. Later the other divisions were allowed to adopt the plan. At these dinner meetings the company's intention of withdrawing from direct merchandise sales was announced, and the dealers were asked to give their suggestion how the company might best assist them to sell major electric appliances.

In two divisions the dealers formed associations to act as clearing houses for members' ideas. In this connection it is pertinent to note that in both cases we refused to accept membership in the associations, and thus made it clear that the company had no intentions of dictating to the dealers. Company representatives appear at dealer meetings only when requested, and in so doing act in an advisory capacity without benefit of vote.

From the two associations and from individual dealers we received suggestions that were later established as dealer policy. Contrary to the general predictions that dealers would make unreasonable requests, we found that most requests were surprisingly reasonable and fundamentally sound. The company is willing to aid dealers in any manner that is mutually beneficial to the dealer and the company. We hope to keep our methods of cooperating with dealers quite flexible, and we continue to welcome requests and suggestions from the dealers.

The four most important ways through which we attempt to help the dealer are briefly sketched below:

A—Sales Helps—The company maintains a staff of experienced men whose services are available to dealers. These men can show dealers proven sales methods, outline campaigns, advise on advertising and window display matters, and, perhaps most important of all, they are fully capable of training "rookie" salesmen to sell electric ranges and electric water heaters.

B—Home Economists—The company maintains a staff of experienced home economists whose services are available to the dealers. Every customer purchasing a range from one of the cooperating dealers receives a call from one of our home economists and an attempt is made to have the customer attend a "new-user class" demonstration. Where classes are not available, the home economist personally calls upon the customer in her own home. Dealers are encouraged to install electric kitchens in their stores and our home economists will conduct dealer sponsored classes where such kitchens are available.

C — Financing — Portland General Electric Co.'s low rates enabled it to be one of the first utilities to act as a fiscal agent for the Electric Home and Farm Authority. Under the EHFA plan approved dealers may sell electric appliances to our customers on virtually any length terms the customer desires. Our method of handling is such that the dealer receives his money within 48 hours after presenting the properly executed contracts. Separate and apart from EHFA, the company finances (without recourse to the dealer) wiring and installation costs for electric ranges or electric water heaters.

D—Advertising—Dealers outside of the metropolitan area are encouraged to support their local newspapers through a cooperative advertising plan wherein provisions are made for the company to share one-half the dealers cost of newspaper advertisements of electric ranges and electric water heaters.

The advocates of the plan for load building entirely through dealers claimed many advantages would be gained by the utility willing to cooperate wholeheartedly with merchants selling electrical equipment. Among the many, three major advantages were cited:

"New user" classes in electric cooking conducted by trained home economists on the PGE dealer-cooperative staff are a regular part of the utility's dealer program. Here Mrs. Thelma Brown is lecturing to a class in one of the utility's demonstration kitchens

(1) Dealer relations—and thus indirectly public relations—will be greatly improved if the utility cooperates instead of competes with its local merchants.

(2) Dealers, given proper support by the utility, will sell a greater number of electrical appliances than even the most aggressive utility merchandising department.

(3) Operating under a well devised dealer cooperative plan, the cost of adding the appliances in which the utility is most interested will be less than the cost when the utility was aggressively merchandising.

Having completed one and one-half years of operation under the new policy, the Portland General Electric Co. can now comply with the request from the editor of ELECTRICAL WEST to analyze the accomplishments in the light of the claims made by advocates of utility load building through dealers.

Dealer and Public Relations

Every electric utility is primarily engaged in the manufacture, distribution and sale of electric energy; in other words, the basic interest lies in the revenue derived from the sale of kilowatt-hours.

Every merchant engaged in the sale of electrical merchandise is concerned only with the moneys derived from the sale of his electrical appliances.

Both the utility and the merchant hope to make a profit in their business. Obviously, then, any plan which furthers the interests of both the utility and the merchant may be said to be truly cooperative. Conversely, any plan which causes friction between the two is bound to be detrimental to the welfare of one or the other, or both.

Of the two parties concerned, the utility, because it is dealing with the public as a whole, must pay great care to what is commonly known as its public relations. In most communities, the merchants, through fraternization in the Chamber of Commerce, service clubs, church, and civic activities, are highly influential in calming or exciting public opinion. Most everyone agrees that in any community where the merchants are antagonistic to the utility, that utility is considered to have bad public relations. Not everyone, however, is willing to agree to the converse, namely, that where the utility enjoys the good will of the merchants it will have good public relations.

Good Will Theory

The company's dealer cooperative plan has been developed on the theory that if we gain the good will of the merchants engaged in the sale of electrical appliances, they will influence the butcher, the baker, and the candlestick maker, and in due time build up in their community good public relations towards the utility. The plan is nothing more than a realization that the objective of the utility is to sell kilowatt-hours, and that the objective of the merchant is to sell electrical appliances. Both utility and merchant have a common interest—the adding of kilowatt-hour consuming appliances to the utility's distribution system. Both are willing to spend money and energy to build business; the plan is simply to try to see that all this money and effort is not wasted in competition, but is spent cooperatively to the maximum good of both parties concerned.

When the company announced its dealer cooperative plan of load building in July, 1938, dealers and jobbers were openly suspicious of its good intentions. It is indeed gratifying to note that as the company starts its second full year of load building in cooperation with dealers, the suspicion, skepticism and opposition of a year ago have completely disappeared. As far as is known every dealer is now satisfied that the company is earnest in its efforts to work cooperatively with the dealers. The manufacturers, distributors and jobbers are energetically working to build dealer outlets for their products. With all working towards a common goal it seems quite logical to look to the future with considerable optimism.

Proof of Success

Perhaps the most startling evidence tending to prove that the company has succeeded in improving its trade relations is found by the manner in which the dealers and their salesmen are defending the company against criticisms. Most experienced utility men can cite numerous cases where dealers have "passed the buck" to the utility when faced with a high bill or low voltage complaint. In recent months numerous cases have been called to our attention where dealers have spent considerable time analysing a customer's bill by breaking it down into the probable cost for lighting, the probable cost for refrigeration, and the probable cooking cost. While it is true that the company's dealer cooperative representative has taught the dealers and salesmen how to analyse an electric bill, the fact remains that no dealer nor appliance salesman will take the trouble to defend the company's billing and rate structure until he has adopted a friendly attitude towards the utility.

Further evidence of friendly relations with dealers may be seen in the advertising copy placed in the local newspapers by the dealers. No attempt has been made to write copy for dealers; most of the advertisements are made up from mat service furnished by the manufacturers. Occasionally, however, the dealer injects his own ideas into the copy and it is not unusual to find reference to "Portland General Electric Co.'s Low Electric Rates." One dealer even advertised "The Lowest Electric Rate in the United States for Automatic Water Heater Service!" Such an enthusiastic statement, while lacking in veracity, is certainly indicative of dealer good will.

Comparative Sales

When the company announced its decision to discontinue merchandise activities, few dealers had trained sales organizations capable of taking over the load building responsibility thrust upon them. For this reason a sharp decrease in sales might have occurred had not great care been taken to shift the load building responsibility from the utility to the dealer in easy stages rather than too abruptly. Dealers were encouraged to build their sales forces by drawing their personnel from the utility's sales force. The confusion resulting from the change of employer, it was feared, would tend to reduce sales volume for the

Dealer advertisements like these—hundreds of them—are directed at electrical consumers in PGE territory in a year round-barrage. More than 25,000 column inches of newspaper space were used in 1939 by participating dealers

first two or three months. The year 1937 had been a record-breaking year for sales volume, and general business conditions in 1938 were admittedly less favorable than during the summer of 1937. The company was happily surprised to note an immediate increase in sales volume rather than the anticipated decrease from the sales record for the previous year. When at the end of the first six months of operation, total unit sales of electric ranges and water heaters for all divisions operating under the new policy were compared with the total (dealer and company) unit sales for the same months of the record breaking year of 1937, total sales were found to have increased 23.2%. During the same period, divisions continuing to merchandise showed a decided decrease from the total unit sales of the previous year.

By the first of 1939 all nine divisions of the company had retired from direct merchandising, and the company's entire sales personnel was busily engaged building load through dealer sales outlets. Promotional efforts were designed to gain the maximum results in each individual division, and while the operating methods in strictly rural territories differed somewhat from the operating methods in the metropolitan area, the basic plan of building load through a cooperative effort with the dealers has always been followed.

New load added to the lines of the company during 1939 has been quite satisfactory. Final figures on electric range and electric water heater sales indicate 1939 sales exceeded those of 1938 by 22.4%. In fact new sales records for both electric ranges and electric water heaters were established during 1939; electric range sales exceeded the 1937 record by 19.4%, and electric water heater sales in 1939 exceeded by 18.3% the previous (1937) all time sales record.

Comparative Cost of Load Building

The true cost of adding an electric range or water heater to the lines of a utility is difficult to obtain. Indeed, the subject is almost certain to start an argument whenever it is discussed amongst utility men. Each utility engaged in merchandising electrical appliances seems to have a different idea of accounting procedure to cover such factors as:

(a) The apportionment of the salaries and commissions of sales people to be charged to promotional expense as differentiated from merchandise expense.

(b) The percentage of overhead and executive salaries charged to sales or promotional expense.

(c) The interest charged on moneys tied up in merchandise stock and display equipment.

(d) Taxes on merchandise stock.

(e) Warehousing, uncrating, handling and delivery charges on merchandise sold.

(f) Distribution of office rental, telephone, light, heat, and janitor expenses.

(g) Charges of accounting, billing and collecting, handling and reconditioning repossessions and reverts, and losses sustained on uncollectible accounts.

(h) Inventory losses.

(i) Free service on company sold merchandise.

(j) Adjustments made after the expiration of the warranty guarantee on merchandise sold by the utility.

Frequently statements are made that utility merchandising departments are able to meet their expenses from the profits of the merchandise sold. Obviously the ability to make a profit on "merchandising" depends largely upon whether the management is willing to accept all items of expense connected with "load building" as Merchandise Accounts or insists that a portion of expense be charged to Sales Promotion Accounts.

During 1936 and 1937 the accounting procedure followed by the Portland General Electric Co. did not provide for charges to the Merchandise Accounts for such items as general office and warehouse rental, light, heat and power, and telephone service. Only one-third of the salaries and commissions paid to salesmen were charged to Merchandise Accounts. The remaining two-thirds were charged to Sales Promotion Accounts. Despite the greatly reduced burdens, the net from Merchandise Accounts showed a large loss in both 1936 and 1937.

There are obvious difficulties which preclude the possibility of obtaining truly comparable figures for the cost per unit added to the lines under the merchandising policies followed in 1936 and 1937 and the cost per unit added under the dealer cooperative plan in effect during the 1938-1939 period. For the purpose of this discussion it should suffice to point out that discontinuing the handling of merchandise, as provided in the dealer cooperative plan, automatically eliminated such costs as interest and taxes, and inventory losses on merchandise stock, warehousing, handling charges, and adjustments on merchandise sold. No additional charges were added to the Sales Promotion Accounts; in fact, sales supervision, accounting, and general overhead expenses were reduced by eliminating the merchandising activities. During 1939, Sales Promotion Expense for the company has been reduced considerably; in fact, expenditures charged to Sales Promotion during the last two years the company merchandised were 25 to 30% higher than expenditures charged to that account in 1939.

M. J. Murdock, who operates the "Electrical Center" in Portland, is one of the many dealers who have installed all-electric demonstration kitchens in their stores. Murdock invites women's clubs, church, school and other groups to make use of this handsome "salesroom"

There are but two main items of cost for load building under the dealer cooperative plan, namely: (1) advertising (2) sales personnel expense.

Advertising is, of course, the backbone of any load building program. The Portland General Electric Co. has encouraged dealers to advertise in their local newspaper and has found that product advertisements are considerably more effective when signed by the local dealers. Cost of advertising is also less due to rate differentials—the utility paying national rates while the dealer can obtain the local rate. Total column inches of range and water heater advertisements appearing in publications printed in PGE territory during 1939

was greater by far than any previous year, and production and per column inch costs greatly reduced.

Company Salesmen Hired

As previously mentioned, dealers were encouraged to hire salesmen holding positions with the company. Thus the dealer cooperative plan was placed in operation without the necessity of discharging larger numbers of utility salesmen. During the transition period manpower costs were naturally high. As utility employed salesmen resigned to go to work for the dealers, the manpower costs were gradually reduced until at the end of the eighteenth month the total salary and expense of salesmen and supervisors was approximately one-half the total amount spent during July, 1938, the first month of operation under the new dealer cooperative plan.

At this point it might be well to mention that while the utility supported sales force has been reduced approximately one-half, the actual sales force calling upon the customer has been expanded many times.

Summary and Conclusions

The evidence found in the records of the Portland General Electric Co. certainly substantiates the claims made by the advocates of the plan for load building entirely through dealers. Sales volume of electric appliances sold in 1939 has increased over any previous twelve month period. The combined unit sales of electric ranges and electric water heaters made under the dealer cooperative plan in effect during 1939 were approximately 20% greater than the total dealer and utility sales of ranges and water heaters made in 1937, the best year during which the company merchandised.

The cost to the company in getting this increased load has been considerably less than that which was previously spent. Despite the fact that more advertising, using more effective copy, reached the public, and more electric appliance salesmen were in the field than ever before, total Sales Promotion Expense for 1939 was many thousand dollars less than the sums spent in 1936 and 1937.

The improvement in public relations under the new plan can not be measured in terms of dollars and cents; nor can the improvement be expressed as a plus or minus sign. That dealer and trade relations have improved noticeably, there is little doubt. Letters received from dealers ofter voluntarily express appreciation of the benefits brought to them by our new plan. Newspaper managers and editors tell us that dealers in their communities are openly championing our cause. We know these things can not be purchased—they must be earned.

Experiment

PG and E to help dealers boost range and water heater sales

To combat increasing competition of "bottled gas" Pacific Gas and Electric Co. has established an experimental dealer cooperative range and water heater sales promotion plan in its Stockton division. The program incorporates several radical innovations, including payment of a portion of the dealer's advertising costs, trade-in allowances in which the company participates and a bonus plan for dealers who sell approved appliances.

Electric range and water heater advertising ordinarily appearing over the company's signature will be increased and dealer advertising stimulated through a plan whereby the company will pay one-third of the cost of dealer's newspaper space. A fund of $2,500 has been set up, thus assuring at least $7,500 in dealer newspaper copy.

In order to qualify for participation in the plan dealers must agree in writing to sell only Underwriters' approved merchandise, to maintain a continuous display of at least two new models of ranges of 6-kw. capacity or more, to do the same with at least one new model automatic insulated storage type electric water heater of not less than 3-kw., 18-gal. capacity and do a reasonable amount of advertising. Qualified dealers will receive a bonus of $10 for every electric range sold which does not replace similar company served gas or electric equipment at the identical location. A $5-bonus will be paid for sales of approved type water heaters with similar restrictions as to replacement.

In addition qualified dealers will receive the benefit of the company's display service. Arrangements will be made for the preparation and installation of an electric range window display once every six weeks for each dealer without charge.

Trade-in allowances, of which the company will pay one-quarter, have been set at a maximum of $20 for ranges unless the appliance has re-sale value in excess of that amount. A $5 allowance is made on obsolete electric water heaters or furnace coils and $10 for a "bottled gas" heater. Appraisals in which the company participates are made by its own personnel.

Special terms have been provided to finance wiring costs. The company will carry wiring contracts with no down payment, no carrying charges, a minimum monthly payment of $1 and a maximum term limit of 36 months.

Company home service representatives will be available for follow-up of all dealer or company ranges sales. They will also handle cooking or baking complaints and will be available for conducting small cooking demonstrations to selected groups.

The program is to extend through 1940 and since its announcement has been enthusiastically received by dealers.

Spring Campaign

Range and water heater program set for Intermountain territory

Dealers, jobbers, utilities and the Electrical League of Utah are scheduling for early spring a three-month range and water heater compaign to further increase the use of these appliances in the Intermountain territory.

The campaign this year will feature aggressive advertising in newspapers, radio spot announcements, bus and street car cards, outdoor advertising, etc., in excess of $5,000, as well as tie-in advertising by jobbers and dealers.

An integral part of the program will be the cooperation with the Modern Kitchen Bureau's activities. Through the efforts of F. H. Harrigan, Western representative of the Bureau, all M-K-B promotional materal, including Donald Duck's, "Life is Duck Soup with Clean Safe, Carefree Electric Water Heating," and "Fast as Fire Without the Flame," and "Clean and Cheap Like Electric Light," will be extensively used. Individual dealers will feature, during the campaign previews of ranges and water heaters in which the features of each appliance will be brought to the public's attention, and customers will be cordially invited to "Come in and See Our Electric Range Review."

As an additional aid to helping make 1940 a record year, dealers will offer with every electric range a $17 set of highest quality aluminum. Additional promotional material will be furnished by the aluminum manufacturer. In addition jobbers will conduct contests among dealers and dealer salesmen. Campaign began Feb. 26 and will end May 25.

● New Horizons for the Electric Utility Industry is an interesting glimpse into the future of electrical service by Matthew Luckheish, director, lighting research laboratory, General Electric Lamp Dept. Published in book form, this address presents a new viewpoint on the part the electric utility industry will play in the years ahead. Particularly significant and timely is the recommendaton by Dr. Luckheish that present and future applications must be interpreted to the customer in terms of "benefits."

ELECTRICAL WEST SALES GUIDE

FASTER SELLING, TOO

WITHOUT THE FLAME

You have a selling edge when you sell an electric range. Every challenge has been met by it. It still has advantages that cannot be imitated, though desperate efforts have been made to do so. These advantages are worth a lot to you in fortifying your sale against competition, in selling up to a better profit.

The way is being made easier for you to sell electric ranges. More ads in national women's magazines by the Modern Kitchen Bureau and manufacturers are whetting the appetite for electric cookery. Articles in women's magazines show electricity as the accepted way to cook. Local utility advertising and that of promotional leagues stimulates local interest in it.

To the salesman electric ranges mean more income, better business for the firm and standing with them, more real satisfaction in helping to bring about the electric way of living.

To the dealer electric ranges hold more gross profit simply because of diminished service calls and costs. There's less sales expense because more of the advertising is being done for you. You can follow up under this barrage to tell prospects **where** to buy. The range is the first step towards the all-electric kitchen—a chance to make a lifelong customer.

This year's slogan links the electric range of today with the thrill of electric light 50 years ago — flameless and clean, too.

ELECTRIC RANGES

MARCH 1940

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OH, BY THE WAY—

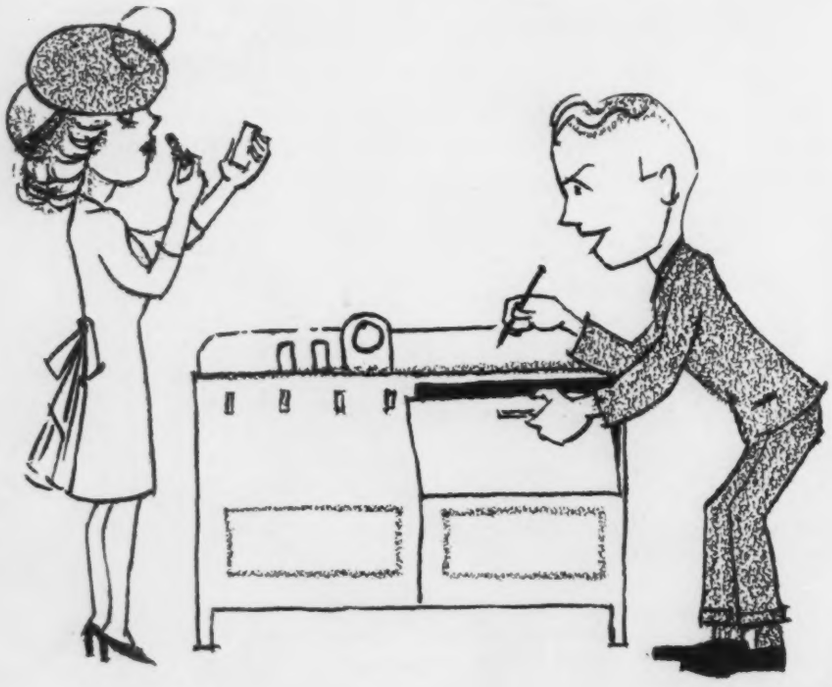
re-openers for the prospect who--

1. Has her mind on something else
2. Wants to buy wholesale or cut price

1. Some women like to talk. If they do they may not let you get in a word edgeways. You never get a chance to explain a single advantage or detail of your range. Others have their mind on something else, or are easily distracted by other things and you find it hard to get them to concentrate long enough to learn why they will benefit from electric cookery.

The strategy you need is the kind that will eliminate the distractions, and permit you a chance to go through your story. When you see that you are up against this sort of a problem, these practical ideas have worked for other salesmen, and should for you. Say—

"Oh, by the way, I am sure you would enjoy a little special treat that I only take the time to show a very few customers. I have an entertaining little movie film that I'd like to show you alone at your leisure."

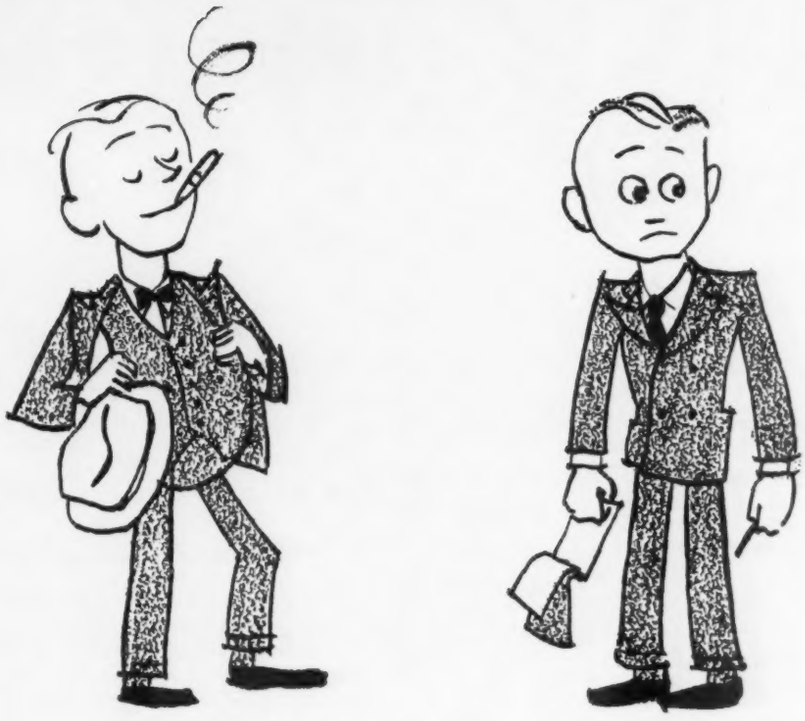


Then arrange to show her a sound-slide film. She will be quiet while it tells the story. It works. Keeps her mind on the subject, tells a logical, convincing story, makes her a little proud to receive such special treatment. If you can't get one from your range manufacturer, use a visualizer. You can keep bringing her back on the subject if she starts to wander.

SUGGESTED BY

Some people think it is smart to buy wholesale, to get an extra discount, to feel that they get deals nobody else can. Often they throw it at you trying to get you to "give" too.

Don't get mad or show your disappointment. They love it. Instead, realize that there is a certain egotism to it that perhaps you can turn to work your way.



2. Instead, compliment them on being shrewd buyers. Say something like this: "That's smart. It shows you want to take advantage of every saving possible, and I don't blame you. But, by the way, though, if you have a few minutes, let me show you this range. You see, when you buy that way you don't have a chance to get the full story. You see, wholesalers aren't set up to give you the attention and personal service that a retailer is. That's how we earn our living, spending more time with you, seeing that you are satisfied after the sale too. You really can't expect that sort of service from them. Now in buying an electric range you want several improvements over older methods—cleanliness, safety, peace of mind, tastier foods,—" and then go on to give the benefits of electric cooking (on the next page). If you do a good job you may convince them that your profit pays them better dividends.

YOUR SALES ALLIES

PUGET SOUND POWER & LIGHT CO. • WASHINGTON WATER POWER CO. • PORTLAND GENERAL ELECTRIC CO. CALIFORNIA OREGON POWER CO. • UTAH POWER & LIGHT CO. • IDAHO POWER CO. • THE MONTANA POWER CO. ROCKY MOUNTAIN ELECTRICAL LEAGUE

HERE'S AN IDEA

and

CHIMNEYLESS

One of the most appealing and special advantages of an electric range is that it is independent of the chimney. What that means is that its position in a kitchen is not restricted to the flue or piping. It can cook just as well and as safely from the middle of the floor or any wall as near the chimney.

In fact, tell people building a new house to save the cost of a kitchen chimney flue—and put the difference into a better range.

Attractive layouts, placing the range in the center of the room and making a snack counter near it, can be suggested. These make unique and much talked about kitchens. This idea in itself may pave the way for a complete electric kitchen. It is surprising how few women know that a counter-high electric water heater may be had to fit into a kitchen cabinet arrangement.

The old fashioned kitchen was a social center. The idea is coming back with the attractive modern electric kitchen. No woman hesitates to bring her guests into such an attractive room. This idea of rearrangement of location of the range often provides a social corner or space for informal visiting. Sell this idea and the range just naturally has to be part of it.

No matter how modest the home this idea can be suggested. It does offer the woman of small means a way to individualize her kitchen, to take pride in it, to make it more convenient. Even a simple plywood backing against the range will make the dividing partition required.

It is with ideas like these that a good salesman lifts his business out of price and above competition.

"MARY HAD A LITTLE LAMB,
COOKED BY FLAMELESS HEAT;
IT'S TENDER AND IT'S JUICY AND,
ITS FLAVOR CAN'T BE BEAT!"
BETTER ROASTING and BROILING with Electric COOKING

Come in today and see our 1940
ELECTRIC RANGE *REVUE*

"HI-DIDDLE-DIDDLE, FILL UP YOUR MIDDLE,
WITH JUICY, FLAVORFUL CHOPS,
FOR MEALS THAT ARE TASTY
AND COOKING THAT'S HASTY,
A NEW 'LECTRIC RANGE IS THE TOPS!"
FAST COOKING with Electric HEAT

"SING A SONG OF SIXPENCE,
CHEAP—THAT'S HOW WE FIND IT;
AND BEST OF ALL WE NEVER NEED
TO STAY AT HOME AND MIND IT!"
MORE FREE TIME with Electric COOKING

Now going on . . . our 1940
ELECTRIC RANGE *REVUE*

Say that

IT'S MATCHLESS

and that means

MODERN—it is tomorrow's way to cook today. Others imitate but never quite equal the quality of electricity.

ACCURATE—gives identical results every time. Keeps heat under absolute control. **ATTRACTIVE** too, it really dresses up the kitchen.

TIME-RELEASING — Automatic timing starts, watches and stops the cooking for you, reliably. Gives you more time for family or other affairs.

CLEAN—clean pots and pans, clean walls and kitchen, clean air, the range itself so easy to keep clean.

HEALTHFUL — Prepares better looking, more appetizing, tastier, better digested food. Preserves vitamins and mineral salts and flavors.

LABOR-SAVING — Oven meals save preparation time. Accuracy saves pot watching. Cleanliness saves housework. **LONGER LASTING** too, the electric range utilizes heat without corrosion of the range and its metal parts.

ECONOMICAL—Most cooking is done coasting. Save in food shrinkage, and by cooking less expensive cuts. Brings other electrical uses on lower rate steps. Reduces housekeeping costs.

SPEEDY—"Fast as fire without the flame." After full heat is reached, it cooks on stored heat. **SIMPLE,** too, for even a child can operate it.

SAFE—With complete peace of mind you can leave it to cook a meal, or allow children to operate it. It is healthier for house plants, pets and family. **SUMMER COOKING** is cooler with electricity.

YOU MIGHT TRY

Cartoons and jingles to tell the happier story of electric cooking are available from the Modern Kitchen Bureau.

Spring Market

Buyers gather at Western Furniture Mart early in February

Spring Market Week opened Feb. 5 at the Western Furniture Mart, San Francisco, and for five days thousands of buyers from the 11 Western States, Hawaii, Alaska, and even the Orient and Europe gathered to see new lines, and to buy. And when they weren't buying they were assembled at various trade dinners also held at the Mart.

On Wednesday evening, Feb. 7, those interested in radio and appliances met in the Mart Club to discuss by far the most extensive showing of radios and appliances to be seen anywhere in the West, and for guest speakers at this annual banquet, they heard George S. Jones, Jr., of Evansville, Ind., vice-president and general sales manager Servel, Inc., speak on "Keep Pace in '40."

"Don't expend energy worrying about things that do not affect your business," was the admonition given by Jones. "The primary need today is for business honesty. We have been charged with a lot of faults which are groundless. Yet few people in business think that it is necessary to refute these charges."

One of the charges that is untrue, he declared is that the cost of distribution is too high. Jones refuted this by citing the case of the refrigerator which sold 15 years ago for $500 with a 50% discount to the distributor, or a distribution cost of $250. Today the same refrigerator sells for $200 with the same discount, or a distribution cost of only $100.

He emphasized the fact that there is both a philosophy and a technique to selling. In selling as well as in distribution, it appears as though technology has outstripped philosophy in recent years. He appealed for a study of the reasons why salesmen sell and what makes them sell effectively. Sales managers in his opinion today spend too much time studying "buying power" and too little time in creating "wanting power." He urged that less time be spent in "building business" and more time spent in building men who will create business.

Next they listened to Sam Vining, Westinghouse director of department store sales, who made one of his inimitable appeals for more personalized selling ending with his famous electric iron demonstration. Here are some of the typical Vining maxims:

"If there was a law passed that forced a man to stand in front of his store for an hour a day to see who passed, volume would increase 25%. . . .

"The public doesn't know anything about price wars — unless we tell them. . . .

"If *you* don't sell your merchandise, the sheriff will come along and tack a sign on your store and a few days later sell your stock to the very people you couldn't sell. . . .

"Too much time is spent selling merchandise and too little in selling people. . . .

"Don't be afraid to turn your back on your refrigerator and face your prospect. . . .

"In the doorbell ringing days it was the first ten words the salesman said that mattered. Today it's the first ten words the prospects says that make or break a sale. . . .

"Appliance selling today is largely following up people with known desires. . . .

"Too many salesmen go into their song and dance without ever learning what the customer thinks or wants. . . .

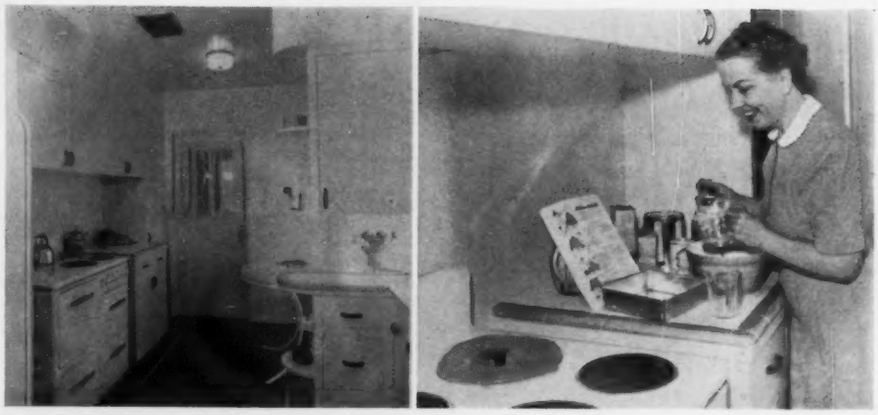
"If most salesmen treated their wives like they treat their prospects they wouldn't stay married a week. They usually act like they thought the customer didn't have good sense. . . .

"Remember it's an event in anybody's life to spend $200. . . .

"Every prospect is a new model and ought to have the same amount of study. . . .

"Give the prospect a basis on which to base her decision, use her judgment and apply her yardstick. Then it will be easy for her to say 'Yes.'"

Chairman of this successful dinner was Charles W. Goodwin, Jr., of San Francisco, district manager, General Electric Supply Corp. Master of ceremonies was John B. Hughes, of San Francisco, noted radio commentator, Mutual Don Lee Broadcasting System.



H. D. BURNS of the Bryant Electric Co., Los Angeles, not only preaches about electricity, but practices it, too. Many modern electrical facilities are a part of his recently built six-room home in San Marino. Here Mrs. Burns tries out a recipe on the new Westinghouse automatic range. There's an 8 cu. ft. refrigerator and a 52-gal. water heater to serve other household needs

FOR THE PURPOSE of outlining 1940 advertising promotional plans, 119 dealers in Utah Power & Light Co.'s Salt Lake division territory gathered to hear W. E. Fleetwood, director of dealer coordination, speak on "More Dollars of Profit for Progressive Dealers." C. A. Wolfrom presided

Future Campaigns

Utilities throughout West march on with varied sales programs

Intensive campaigns on major appliances and spring electrical shows form the bulk of promotion by western utilities as they go into the third month of what undoubtedly appears to be a banner electrical year. For instance:

British Columbia Electric Railway Co., Ltd.—Refrigerator campaign and shows throughout March and up until April 15. Electric range campaigns for April. Annual Electric & Gas Industry Sales Dinner held Feb. 27.

Los Angeles Bureau of Power & Light—Water heater campaign for March. Light conditioning and range campaigns for April.

Portland General Electric Co.—Special campaigns held up pending possible further rate changes. Are going to tie in with Modern Kitchen Bureau range and water heater activities.

San Diego County Bureau of Radio & Electrical Appliances—Laundry equipment campaign for March. Fourth Annual Spring Show set for April 30 to May 5.

City of Seattle Lighting Dept.—Automatic electric water heater campaign. Department will install for dealers automatic electric water heaters for $15 charge. Also commercial electric cooking campaigns in March. Electric range, wiring, for same extended to dealers at $20 charge. March program will also be continued throughout April. Cooking schools, training of dealer salesmen, annual cooperation with master builders in their housing show will be special events for March.

Southern Colorado Power Co.—Range, water heater campaigns for March. Range, water heater and refrigerator campaigns for April.

Utah Power & Light Co. and subsidiaries, the Western Colorado Power Co.—Cooking, water heating, washer, space heaters, poultry brooding, store lighting campaigns for March. Cooking, water heating, stokers, refrigerators, poultry brooding, commercial lighting (gas station), campaigns set for April.

Valley Electric Supply Co.—Electric range campaign for March, with a lighting campaign scheduled for April.

● "MUSICAL AMERICANA," a program of popular music in appreciation of things American, is now being presented by Westinghouse Elec. & Mfg. Co. every Thursday night on NBC Blue Net Work at 8:30, Pacifc Standard time. A swing choir and 100 Men of Melody along with the Westinghouse radio orchestra are featured with Deems Taylor composer and Raymond Paige conductor. Milton Cross, famous NBC announcer, is commentator.

Hotpoint Movie

"Blame It on Love." is produced with Hollywood star cast

A full length feature motion picture, "Blame It on Love," has been completed recently by the Edison General Electric Appliance Co., Inc. and will be released this month in each of the twelve Hotpoint districts. The picture will be shown under the auspices of local retailers and utilities selling Hotpoint home appliances.

This picture is said to set a new high standard in commercial moton pictures. Produced in the Hal Roach Studios in Hollywood, "Blame It on Love" has a full cast of well-known Hollywood players, including Joan Marsh and Cissy Loftus.

Miss Mildred Hickman, manager of Hotpoint Home Economics Dept. was on the set during every moment of actual "shooting." L. J. Sholty, vice-president of Maxon, Inc., Hotpoint advertising agency, was also present, as Hotpoint technical advisor.

APPLIANCE SALES REPORT, 1940

A Summary of Dealer and Utility Reports Compiled by Associations, Societies, Bureaus, or Dealer Contact Departments of Utilities

REPORTING COMPANIES	Idaho Power Co.[1]		Northwestern Elec. Co.[2]		Montana Power Co.[3]		P. G. & E. Co.[4]		San Diego Cons G. & E. Corp.[5]		San Joaquin Power[6]		Southern Calif. Edison Co., Ltd.[7]		Utah Power & Lt. Co.[8]		Wash. Water Power Co.	
	Curr.	1 Mo.	Curr.	† Mo.	Curr.	† Mo.	Curr.	12 Mos.	Curr.	12 Mos.	Curr.	12 Mos.	Curr.	1 Mo.	Curr.	12 Mos.	Curr.	1 Mo.
Ranges	160	160					249	3,833	31	484	98	1,379	141	141	253	3,494	143	143
Water Heaters	48	48					181	2,843	36	437	61	733	46	46	44	990	122	122
Air Heaters, aux.							1,472	5,224	452	1,752	110	393					137	137
Air Heaters, 220							101	1,245			54	613						
Refrigerators	151	151					2,732	46,775	462	7,779	138	5,330	2,316	2,316	360	9,444	346	346
Dishwashers							12	149			4	28			1	32	3	3
Washers	321	321					3,027	32,575	330	4,230	275	3,689	2,123	2,123	779	8,953	323	323
Ironers	29	29					728	5,698	63	619	53	508	282	282	75	616	17	17
Vacuum Cleaners	129	129					3,601	33,440	332	2,984	147	1,035	886	886	572	4,579	181	181
Radios	1,023	1,023					24,165	129,988	2,750	14,275	1,142	7,553	5,755	5,755	2,720	18 688	1,626	1,626
Mixers	94	94					1,480	4,632	647	1,954	234	649	443	443	580	1,948	173	173
Cookers, Casseroles	16	16							269	808	67	411	19	19	35	158	140	140
Irons	472	472							614	5,361	414	3,277	1,094	1,094	1,663	11,983	43	43
Waffle Irons	178	178							701	2,555	321	1,154	623	623	979	4,367	199	199
Toasters	301	301							1,025	3,985	438	1,665	669	669	1,006	4,443	462	462
Table Stoves	105	105							177	679	35	304	200	200	301	3,823	275	275
Heating Pads	173	173							373	1,466	158	519	368	368	564	2,334	209	209
Curling Irons													44	44	118	1,545		
Coffee Makers	233	233							894	4,847	320	1,611	307	307	322	1,917	334	334
Sewing Machines							718	6,268	179	1,407	20	151			445	2,313	67	67
Clocks	205	205							1,380	5,946	455	1,383	482	482	898	3 967	277	277
Fans	4	4									6	754	11	11	19	1,698		
Floor Polishers																		
Sun Lamps	38	38											36	36	20	80	10	10
Reflector Lamps	393	393									556	2.445						
Misc. Lamps	610	610																
Shavers													226	226				
Yard Lights											32	487			25	327		

SOURCES

[1] Figures compiled by Electric Equipment Sales Association. Include power company sales of all reporting dealers.

[2] Lists appliances sold by dealers in Portland area. Figures compiled by Northwestern Electric Company.

[3] Combined dealer and company sales from report of Montana Power Co.

[4] P. G. & E. reports sales of major appliances only based on accurate reports from dealers' accounts. Ranges, water heaters and air heaters include company and dealer sales. * Due to delays in compiling report current and total figures are always one month behind those figures of companies reported in other columns of this table.

[5] Gathered by Bureau of Radio and Electric Appliances of San Diego County. Estimated monthly sales figures used in this table: Miscellaneous figures include fans, curling irons and sun lamps.

[6] Compiled from dealer reports by Merchandising Division of San Joaquin Power.

[7] Includes reports from dealers on San Joaquin Valley system of company as well as Southern California areas served.

[8] Includes Utah Power & Light Company territory in Utah, Idaho and Wyoming. Also Western Colorado Power Company territory.

† December figures were not available at time of going to press.

THE PACIFIC COAST ELECTRICAL ASSOCIATION

Industrial Data Sheet No. 1

SUBJECT. TEMPERATURE CONTROL FOR PISTON GRINDING
PLANT.....UNITED ENGINE & MACHINE CO., INC.
SERVING COMPANY.....PACIFIC GAS AND ELECTRIC

PREPARED by G. E. HERSAM

Problem

1. Automatic temperature control of grinding solution for piston-grinding operation.

2. Each grinding machine contained 40 gal. of grinding solution, with an animal-fat base, circulated at the rate of 20 gal. per min.

3. Previous atmospheric temperature variations made precision grinding control difficult. A variation of 30° F. on a 4-in. aluminum piston produced a variation of approximately 0.0012 in. although it was desired to hold tolerances within plus or minus 0.00025 in.

Equipment Description

1. The sump containing the grinding solution on each grinding machine was equipped with two 2-kw. immersion units, making a connected heating load of 4 kw. per machine.

2. A thermostat was installed for temperature control.

THE CUSTOMER

United Engineer & Machine Co., Inc.
310 Preda St., San Leandro, Calif.
C. Sulprizio.....president
D. M. Pearson.....chief engineer
J. H. Kalakian.....shop superintendent

Operation

1. The thermostat controls the immersion heating units to maintain the temperature of the grinding solution to within 2° F. above or below 80° F.

2. Electrical heating consumption is approximately 4 kw.-hr. per hr.

3. Gages are held in the grinding solution to maintain them at the same temperature as the pistons.

Realized Advantages

1. Finished piston inspection rejects have been reduced from 15% to less than 1%.

2. Production and inspection has been greatly simplified.

3. Piston tolerances are now held within plus or minus 0.00025 in.

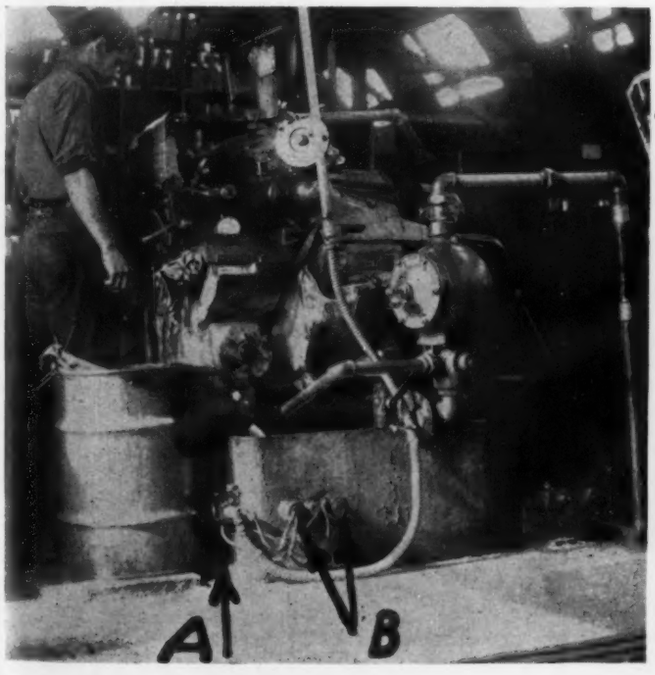
4. The rigid specifications of such firms as the Hall Scott Motor Car Co., Pacific Greyhound Bus Co. and other important users are met.

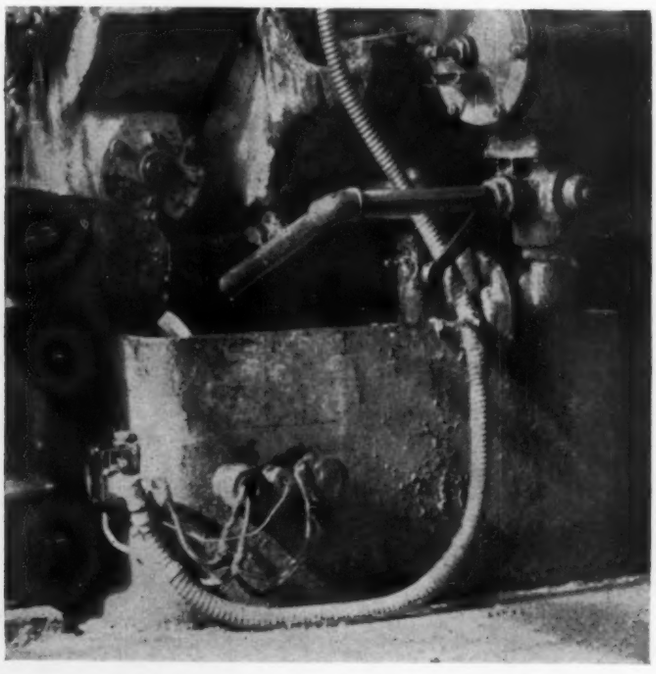
Operation has proved so satisfactory that all new grinding machines are being initially equipped with thermostatically-controlled solution equipment.

Other Possible Applications

Temperature control of any solution used during cutting or grinding operations requiring close tolerances. There are a vast number of such potential applications.

Electric heat is applied to the grinding-compound sump at the base of the machine. A indicates thermostat, B the two 2-kw. heaters





NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

Utilization Data Sheet No. 16

SUBJECT.....ENAMEL BAKING OVEN
CUSTOMER.....BOULTON AUTO REBUILD, SEATTLE
TYPE OF BUSINESS.....AUTO PAINTING
SIZE OF BUSINESS.....20 EMPLOYEES
SERVICE COMPANY....PUGET SOUND POWER & LIGHT

Prepared by H. Van Wyk
for the Commercial Section

Various processes are in use throughout the country for drying enamels on automobiles. This one, however, consisting of air circulation and partial recirculation, has been found exceptionally successful, because it will drive off the volatile while retaining most of the heat.

Electricity lends itself readily to this process because its use requires no elaborate machinery for directing the air.

The electric heating elements are placed in a compartment on top of the oven. To one end of the compartment is connected a blower which forces the heated air through a duct down one side of the oven to an air chamber, from which it is released through the slots shown in the picture.

Henry and Art Boulton inspect a finished car. Over car top can be seen the humidifying trough, air inlets on same wall. Contactor and control at left

The hot air travels crosswise through the oven. Part is exhausted through a vent at the top of the oven, while the balance enters a second air chamber, is returned through ducts to the blower and recirculated. An intake vent takes new air at the suction side of the blower.

Processing an automobile takes 1 hr., as compared to 48 hr. without the oven, and the finished product is much better. The oven is automatically controlled, and fresh air is filtered before admission. Troughs along the side of the oven supply moisture to maintain high relative humidity.

Advantages

Advantages realized through the baking process are: (1) new-car finish; (2) harder finish; (3) increased production and sales; (4) less dust-free space required.

Advantages of electric heating include: (1) saving of labor cost by elimination of heating-plant attendant; (2) lower installation cost than fuel-fired process; (3) close temperature control; (4) reduction in time required from 48 to 1 hr.; (5) automatic control; (6) low maintenance cost; (7) simplicity of construction.

The Customer Writes:

January 22, 1940

Dear Mr. Van Wyck:

The automobile enamelling bake-oven designed for our shop by you, and installed under your supervision, has now been in operation for nearly a month.

The efficiency of the electrical installation is proving entirely up to my expectations. The uniformity of heat distribution in the oven and the rapidity with which the temperature is raised makes it possible to bake a beautiful and durable paint job in an hour's time at a cost of 50 to 75 cents for electricity . . . we are well satisfied.

Your very truly,
HENRY G. BOULTON.

Equipment Installed

(New installation of heating equipment, no equipment replaced)

Device	Rating (kw.)	Cost $
26 PTF-24 Chromalox 2,000-watt finstrip units at 5.90	52	153.40
1 AR Thermost. style Chromalox		12.50
1 70-amp. Trumbull 440-volt contactor		43.00
1 Peerless 1¾, 1,140-r.p.m. utility blower	0.55	57.53
1 Brown air-flow switch		10.00
Total	52.55	276.43

Total installed cost.....$470

Operating Data

Product.....Repainted Automobiles
Production.....5-8 per day, or 100-140 per month
Labor.....300 man-hr. per month
Fuel.....Electricity 5,000 kw.-hr. per month
Operating period.....8-hr. day
Temperature.....120°-190° F.

(Product is same as new-car finish. Air drying takes 48 hr., oven process 1 hr.)

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

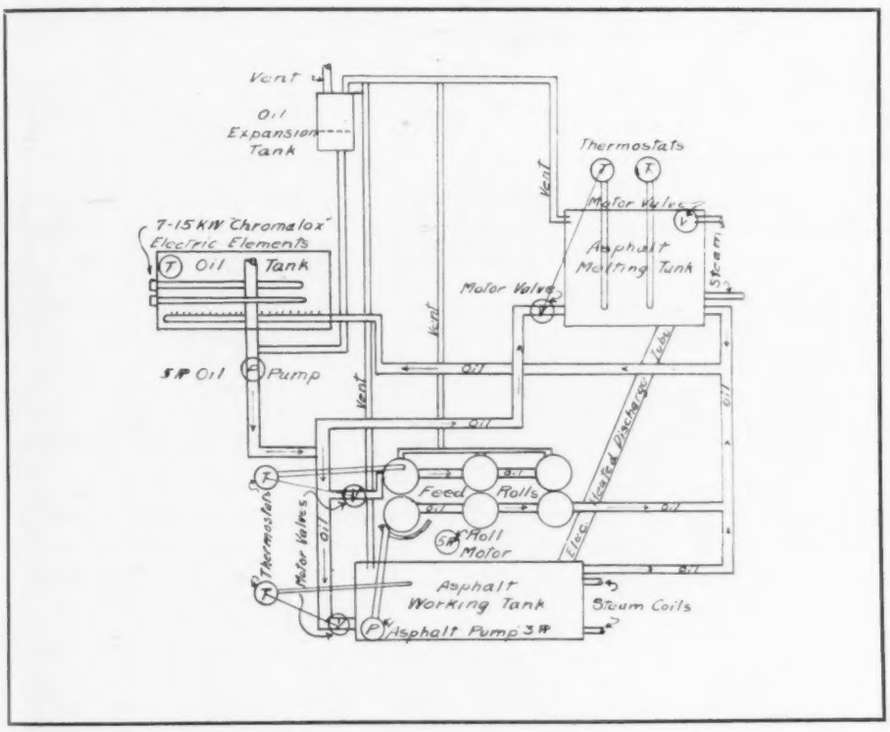
Utilization Data Sheet No. 17

SUBJECT.....HEATING ASPHALT AND GILSONITE
CUSTOMER...FIR-TEX INSULATING BOARD CO., ST. HELENS
TYPE OF BUSINESS..MANUFACTURING INSULATING BOARD
SERVICE COMPANY.....PORTLAND GENERAL ELECTRIC

Prepared by A. L. Apperson
for the Industrial Section

To prevent asphalt-coated boards from sticking together when piled, it is necessary to use an asphalt product with a high melting point and to operate at a high temperature. Gilsonite, an asphalt compound, was found satisfactory for this purpose.

Hot oil is circulated through the revolving feed rolls and asphalt-tank coils of the coating machine illustrated in order to obtain a working temperature of about 500°F. Full automatic operation is obtained by the use of thermostats and motor-operated valves in the steam and oil lines.



Operation

The method described yields higher working temperatures than can be obtained with steam without installing expensive super-heating or high-pressure equipment. The temperature is too low to warrant mercury. Dowtherm is designed to fit this temperature range, but in this application was rendered impracticable by reason of the tightness of joints its low viscosity and low surface tension would have required.

Penn oil SAE 10, heavy duty, was found to have suitable characteristics. It has a specific heat of 0.69 at 500° F. 325 gal. is required to fill the tank and circulating system. Heat transfer from the oil through the coils was found to be about 50 B.t.u. per sq. ft. per hr. per deg. temperature difference.

The heating elements are 15-kw. each with six heating blades 41¾ in. long. This gives a low heating density of 16 watts per sq. in. of heating blade surface.

Asphalt is pumped from the lower tank to troughs which feed the first set of rolls. Insulating board is fed between the rolls where it receives its coat of asphalt. The second and third sets of rolls act as feeders, wipers and impregnators.

By the time the board reaches the off-bearing platform, temperature has dropped enough to allow stacking without sticking.

This eliminated a previous process of sprinkling with dust.

Speed of the machine has been more than doubled and could be increased still more with the existing heating equipment.

Results

Production has been more than doubled and the customer completely satisfied. It will be noted in the drawing that there is a steam connection to the upper tank. This is needed only when the machine has been shut down for several days.

Advantages

Advantages are: (1) allows piling of board without sticking; (2) more than doubles machine output, hence halves the required man-hours; (3) a better product—more evenly and thoroughly coated board; (4) full automatic temperature control; (5) orders filled promptly—better service to customers.

Equipment Installed

One round oil tank, 36-in. diam. by 52 in. long, equipped with 105 kw. of Chromalox immersion heating elements.
One 5-hp. hot-oil pump for oil circulation.
350 lineal ft. of 1½-in. O.D. welded copper tubing in upper asphalt tank for oil circulation.
250 lineal ft. of 1¼-in. O.D. welded copper tubing in lower asphalt tank for oil circulation
One 3-hp. special pump to feed asphalt to rolls.
Thermostats, motor valves, piping and insulation.
9.5 kw. of incidental electric strip heaters for asphalt tube and special pipe heating.

Operating Data

Product.....Asphalt coated insulating board
Labor....One man feeding, one man off-bearing
Production....Approximately 6,000 sq.ft. per hr.
Fuel.....114.5 kw. of electric heat
Temperature.....Working temp. about 500° F.

Factors Governing Selection of Voltage Regulators — Survey of Principal Western Systems

Company	What factors are governing the selection of particular types of voltage regulators?	Where are induction regulators being used?	Where are step-type regulators being used?	Where are boosters being used?
Coast Counties Gas and Electric	Character of regulation required; first cost; arrangement of feeders, i.e., load-center reg. as compared to general reg. for light density.	In more important urban stations where load-center regulation is desired.	In smaller outdoor rural stations	On long rural feeders.
Los Angeles Bureau of P & L	Coordination of regulator, feeder wire-size and area served, by standardizing on three sizes: 37½ kva., 75/150 amp.; 75 kva., 150/300 amp., and 150 kva., 300/600 amp., all 5/10% regulation.	On all feeders.	None	None
Nevada-California Electric	Experience with some of the newer types is limited, e.g., have used station-type step regulators for only two years.	For individual circuit reg. where 200 amp. or 2,400 volts or 4,100-Y not exceeded.	Station type for bus reg. where values exceed those at left. Distinction primarily one of cost. Branch feeder step regulators as for boosters (at right).	On branch feeders of extreme length or where unexpected load taken at distant point. Sometimes regarded as temporary until circuit could be relieved.
Northwestern Electric	Location, type of load, cost, etc.	Principal substation feeders at 2,400 volts.	None	One applied to long rural line with light loading.
Pacific Gas and Electric	First cost and accuracy and smoothness of regulation demanded by the character of each particular area to be served.	Where individual phase reg. of highest standard necessary on each feeder.	On circuits where 3-phase reg. sufficient or in stations where bus reg. is satisfactory.	On ends of long feeder circuits on power loads where voltage changes only once or twice a day.
Portland General Electric	Type of service and cost of regulators as well as voltage to be regulated, e.g., for 7,200- or 1,000-volt lines, step type is used.	For urban service.	Rural service	None
Public Service of Colorado	Coordinated with overhead feeder design with respect to carrying capacity and regulation requirements. In general, induction type for urban, step type for rural or where close regulation not required.	Universally installed at the substation. Regulators used for spare equipment are retained at the station.	Usually somewhere on the line radiating from the substation. No spare equipment is provided.	Standard distribution transformer somewhere on line radiating from substation. Spares available from standard stock.
Puget Sound Power & Light	Load densities as applied to urban, suburban and rural areas.	In majority of distribution substations.	Suburban and rural feeders and on long feeders beyond range of stations regs.	Where feeders required permanent boost. Temporary pending feeder revamps.
San Diego Consolidated G & E	Close regulation and freedom from flicker and sudden change; continuity not subject to interruption for inspection, adjustment; cost.	In metropolitan areas and substations where large domestic load requires continuity and freedom from flicker.	For boosting long 12-kv. feeders. As 4-kv. bus reg. at subs in moderate size towns where load changes not expected.	On a few, long primary feeders in outlying areas. One or two automatic step boosters for domestic service.
Seattle City Light	Satisfactory performance of induction type over a period of years.	Mostly in substations.	None	None
Sierra Pacific Power	Economy and type of service.	At all substations serving urban load.	Only on rural lines so far.	Rarely used. Only for temporary relief.
Southern California Edison	Three-phase regulators used because circuits are operated 3-phase throughout most of their length. Many induction and a few step-type are in service, but step type is contjemplated for future purchases.	For additions in stations now equipped with induction regulators so circuits may be paralleled.	In new stations and at existing stations when and where it becomes advisable to move existing induction type elsewhere.	Only to take care of a low voltage condition temporarily or to adjust voltage to requirements of specific customer.
Washington Water Power	Voltage, cost and quality of regulation required. We find, however, that 5/8% steps are comparable to induction without undue number of operations. For 2,300/4,000-volt urban, induction has been used exclusively but trend toward step type contemplated.	For 2,300/4,000-volt urban service.	Exclusively above 4,000 volts in past, but experimental 2,300/4,000-volt applications contemplated as at left.	None. We find that where regulation is necessary at all it is desirable to obtain finer regulation than is obtained from boosters.

Keeping Voltage Within Bounds

Regulating practices of 13 representative Western systems surveyed

PERHAPS the fact that during the past five years, or even ten years, practically no technical literature has appeared on the induction regulator testifies to the well-established acceptance and generally satisfactory performance of this piece of equipment.

This absence of discussion has, however, tended to conceal the fact that the induction regulator has, during the past five years, undergone many changes, particularly with reference to control. The equipment offered today is not the equipment of five or ten years ago.

Inherently, the induction regulator should have an extremely smooth characteristic. Practically, however, the older and now obsoleted units may have no such thing.

This was demonstrated in the Northwest last summer when M. F. Hatch, of Washington Water Power, reported to the Northwest Electric Light & Power Assn.* on a study of 75 induction units.

It was found that 20% of the regulators were holding voltage within no smaller than 7 volts total band width, and 50% within 4 to 6 volts. Modernizing the control equipment — which represents less than one-sixth the cost of the total unit—proved to be an effective corrective.

Needless to say, with modern units, and particularly since the advent of the newer contact-making voltmeters, no such shortcomings need be anticipated.

During this same five years, the step-type regulator has been the subject of numerous engineering papers, a situation which is perhaps logical for a unit which is, comparatively, a newcomer to the field. In most cases, each of these has dealt with a specific application.

In the years just past, regulation has been of prime importance. The era was one in which copper was figured closely and, of necessity, distribution could not be planned very far ahead. The period has witnessed a concentration of attention on resort to devices like capacitors to get the most working capacity out of existing lines. It has seen a trend toward the networking of high-load center areas. It has seen the advent of the package substation, bringing some alteration of viewpoint in distribution planning.

It appears, therefore, that the status quo of Western systems is such that no marked change in regulating capacity in percent of, say, transformer capacity appears probable in the near future. (This does not apply to smaller systems, especially in the Rocky Mountain area, where the necessity for voltage regulation is not yet strongly felt.)

All this makes present practice with regard to voltage regulation a logical one to survey.

While the induction unit has been undergoing its refinements, the step-type equipment has likewise come far. The major improvements are simplification and the development of contact materials to the point where 2 million contact operations are indicated without necessity of changing contacts, although the units probably have not been in operation long enough on feeder applications actually to determine contact life.

* Electrical West, June, 1939.

Today, both induction and step-type regulators are standard products of the larger electrical builders and are made on a production basis.

Generally speaking, the induction type has a lower first cost when furnished for either 2,400- or 4,160-volt service, but even in these ratings step types are approaching equivalent price. At higher potentials, the step type is generally considered lower in first cost.

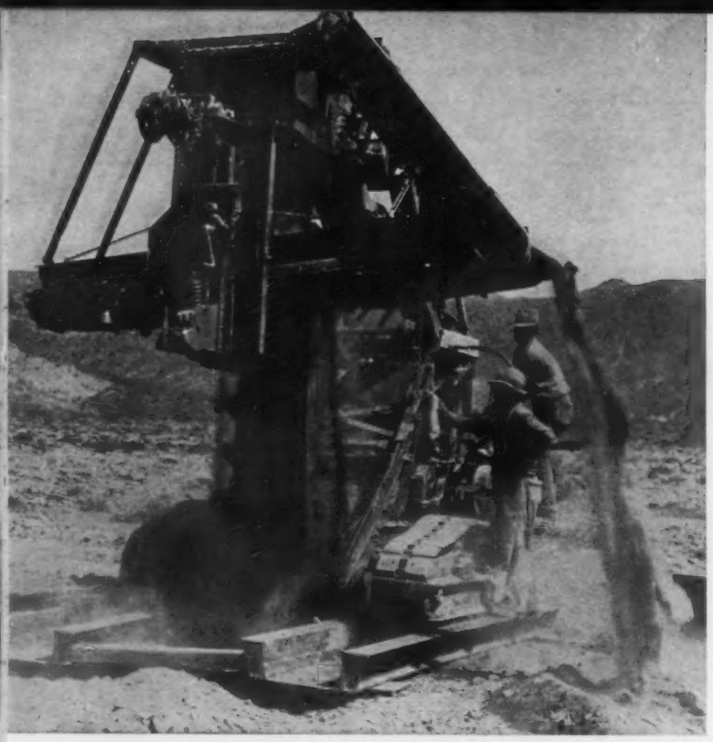
Induction units are available up to about 11 kv., beyond which voltage the step type is generally used. Step types are available both single and three phase. Single-phase units are built from 6 kva. up, and both single and three phase are available in all voltages from 2,400 volts.

The table on the opposite page represents the current practices of 13 principal Western systems. There is a tendency by manufacturers of equipment to scorn the term "step-type regulator" on the premise that the 5/8 of 1% buck or boost now offered is, in many applications, an insignificant voltage change. The views of several systems, as given in the table, would appear to confirm this point. There appears to be a sort of general conformance in Western practice and trend toward more serious consideration of "tap-changing-under-load" equipments in the lower voltage range.

By inference it would seem that future changes in regulating practices, if any, will come about not through changes in systems or equipment, but through the ever-finer regulation which is required by new kinds of final use.

The Line That Doesn't Rest

Southern California Edison's machine-built single circuit works day in, day out; continuous operation near steady-state limit adds to economy; base load transmitted 233 mi.



Barber-Greene excavator digs 8-ft. deep tower footing in three cuts; 14-in. channels support built-up-steel sections for treads

ON THE evening of October 9, 1936, Broadway, Los Angeles, was choked with tens of thousands of people. They had turned out to celebrate the arrival of Boulder power.

Scarcely noticed in that same autumn was the activity of a small group of men in the hot desert to the East. They were building roads, making ready for the construction of Southern California Edison Co.'s transmission line to Boulder.

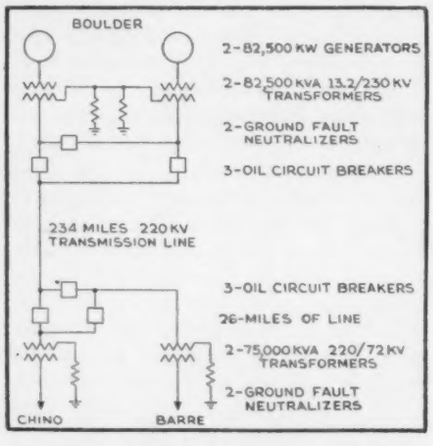
This line was completed May 5, last year. The press needed prodding to take much notice of the job at all. To the public, Edison's line is just another one from Boulder, and very ordinary looking at that.

But to electrical men, certain aspects of the line may be significant. Very briefly, what Edison has built is a single thread of unsectionalized line, which, hour after hour, day after day, has been transmitting 165,000 kw. of power 233.3 mi., for a load factor of 96.7%.

Beginnings

As long as twenty years ago, Southern California Edison was studying power possibilities on the Colorado River, in conjunction with the U. S. Geological survey and other agencies. An application for license to develop power there was filed with the Federal Power Commission but was denied following passage by Congress of the fourth Swing-Johnson bill (Boulder Canyon Project Act) in December 1928.

This act required the Secretary of Interior to obtain firm power contracts from responsible parties prior to construction of the dam. Applications exceeded available power by 222%. Adjustments followed, and in April 1930, Edison signed for its allotted minimum of 7.2% of firm Boulder energy, but guaranteed to take, if available, 21.6%. These percentages correspond to 302.4



and 907.2 millions of kw.-hr. per year.

General Requirements

Originally, it was planned to assign four 62,500-kva. generators to Edison, which in turn planned to transmit the output over two 220-kv. lines. Finally, however, Boulder was laid out with 15 82,500-kva. units, a fact which requires that transmission be operated nearer its limit of steady-state stability and that an intermediate switching station be installed at such time as it is necessary to take the output of four machines. Two are installed now.

In taking power from these two machines, Edison took into account the diversified nature of its energy sources, the figures being:

Rated capacity of system..1,036,000 kw.
Rated capacity of Boulder 165,000 kw.
Rated capacity of steam.... 355,000 kw.

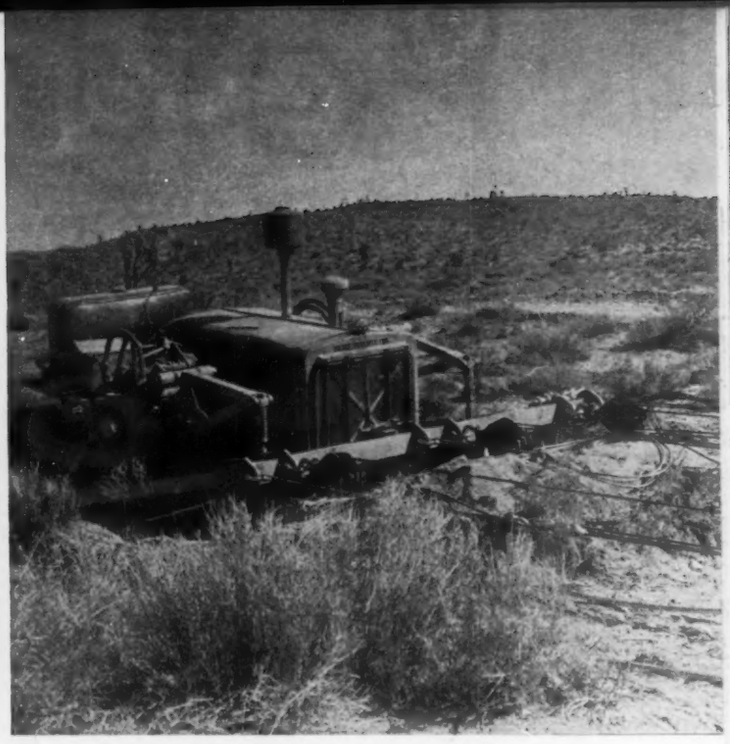
This abundance of rolling reserve made neither double circuits with cross-over stations nor great line refinement necessary and made it possible to regard Boulder as a base-load plant which could be connected to the system by a line designed for maximum economy in first cost.

At the Boulder end, Edison cooperated with the Bureau of Reclamation in working out a unit system wherein there is one generating unit to a bank of transformers, thus eliminating the necessity for low-voltage generator switches. The Arizona wing of Boulder power house is so designed.

At the Western end, the existing 66/11-kv. Chino substation provided a suitable terminus. Subsequently, the line has been extended into Orange County, where Barre substation has been built. Each is equipped with a 75,000-kva. transformer bank and a 50,000-kva. synchronous condenser.

While it was desired to link these terminals at lowest cost, a high degree of reliability was nevertheless desired. In the first place, the 165,000 kw. represents an important percentage of the present system peak, and also it might sometime be desired to convert Boulder to a peak-load source.

Caterpillar sets a light tower footing. The steel boom is adjustable. Four-wheel-drive trucks with A-frame booms set the heavy units



This 42,000-lb. bulldozer has dug itself in to withstand the pull of pre-stretching three conductors to 16,000-lb. tension each

Base-load operation, therefore, dictated a single circuit, while the necessity for reliability led to the stringing of overhead ground wires, the burying of counterpoises where footing resistances exceeded 100 ohms, and the installation of ground-fault neutralizers at line terminals.

With the general nature of the line thus sketched it was possible to determine the costs of energy losses and of fixed charges against conductor and supporting structures for various conductors. This led to the selection of 605,000-circ. mil ACSR composed of 30 strands of 0.1420-in. aluminum and 19 strands of 0.0852-in. steel. Incidentally, the studies showed this conductor to represent the lowest annual cost at any of the annual load factors considered.

The Route

In seeking a route, Edison endeavored to maintain separation from existing routes of the Bureau of Power & Light and Nevada-California Electric Corp. lines, so that all might not be affected simultaneously by storms or other hazards. Hence the route from Boulder westward lies 10 to 25 mi. south of those followed by the others, until it reaches the mountain barrier between the desert and the coastal slope.

Here two alternatives were confronted: Crossing the San Bernardino mountains above 5,000 ft., or going through Cajon Pass. Severe ice conditions which have been encountered in the mountains, led Edison to seek the milder climates of the pass, even though this involved approaching the Bureau's route to within ½ mi. Here, maximum elevation is held to 4,300 ft.

The chosen route leaves Boulder City across open desert to Nipton, then generally follows the Union Pacific R.R. right-of-way to Kelso, where it again moves across rugged desert to Cajon.

This route was by no means ideal.

Electrical Characteristics

Sending voltage	230 kv.
Receiving voltage (Chino)	216-220 kv.
Steady-state power limit	180,000 kw.
Total line loss at 165,000 kw.	19,000 kw.
Charging-current kva.	48,000 kva.
Charging-current loss	600 kw.
Corona loss	500 kw.
Line efficiency at 165,000 kw.	89%
Annual effic. at 900 million kw.-hr.	92%

Physical Data

Length (Boulder to Chino)	233.3 mi.
Towers (number of)	880
Anchor towers	67
Suspension towers	813
Span (average)	1,398 ft.
Minimum span	288 ft.
Maximum span	3,128 ft.
Conductor ground-clearance (average)	45 ft.
Minimum ground-clearance	28 ft.
Normal height to suspension crossarm	78 ft.
Conductor separation (horiz. config.)	23 ft.
Design tension, light load max.	10,000 lb.
Heavy load max.	14,000 lb.

Fourteen miles of it lay through a place called Devil's Playground, an area of blow sand so soft and deep that even light vehicles could not get through. Another part lay through Lucerne dry lake, where adequate footing conditions were hard to find. But, "this route seemed to have a lesser aggregate of evils than any of the other routes considered," and most of it lay on government land where the right to build transmission for Boulder power was granted by the Boulder Canyon Project Act.

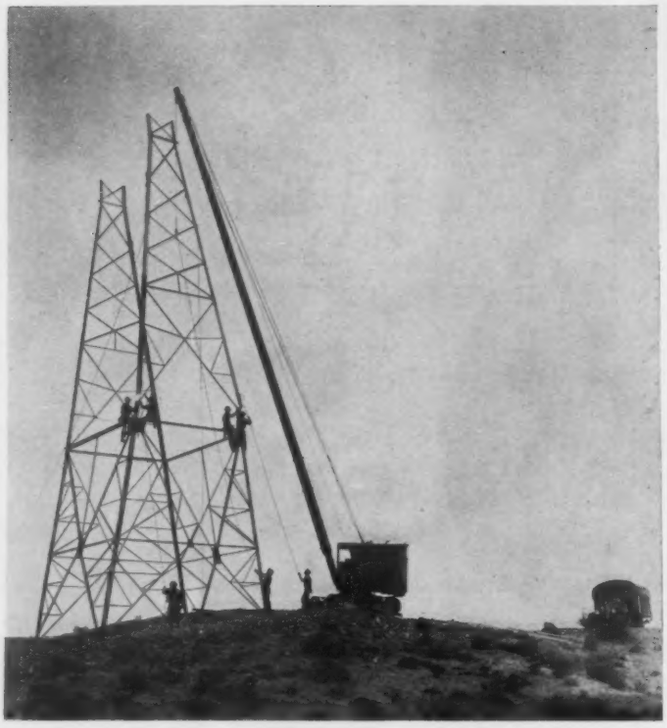
Construction Starts

The work which began in that autumn of 1936 was to make ready for later operations on a larger scale and to clean up ground work in the lowlands where summer suns would bring insufferable temperatures of 140°. Some 200 mi. of permanent patrol road were built, and a 90-mi. section of footing excavations was completed in advance of summer heat.

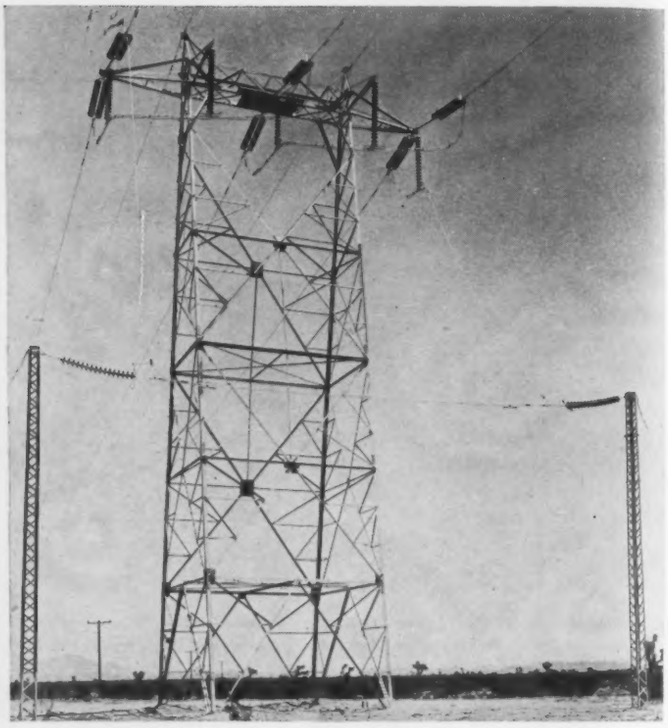
It was on June 1, 1937 that Edison turned over the major construction to Stone & Webster Engineering Corp., and activities got under way on full scale.

Scarcity of water, severe heat and great distances created a problem in the accommodation of men, of whom there were about 360 on the job at one time. Rather than attempt the construction of adequate camps under the hot sun, Stone & Webster chose to center its men at existing highway hotels and auto camps. This limited the size of groups to 25-40 but aggravated the problem of transportation.

It was a mechanized job. Into the field went 116 pieces of rolling equipment, including tractors, trucks and cranes. Among these were 6 four-wheel-drive trucks, four of them equipped with racks for carrying tower steel. There were water trucks—crews in the field consumed a gallon of water per man per hour, and a camp later estab-



The 75-ft. cedar boom, mounted on the tractor-type crane lifts a section of transmission tower which has been assembled on ground



Dead-end tower and auxiliary structure provide for transposition. All towers carry saw-tooth bird guards at arm ends, pans at center

lished for stringing crews required 3,000 gal. per day. There were trucks equipped with standard bus seats so human energy would be conserved while men were being transported on 30-mi. trips to and from the job. And there were assorted pieces of special equipment and three gasoline trucks for servicing the fleet itself.

The first job, as mentioned, was the building of patrol roads, pushed through for the most part with one or two trips with bulldozers, then scraped smooth. Communications made use of existing Union Pacific and Santa Fe facilities connected by a 25-mi. line. Trucks which dug pole holes for this line carried water barrels, the water being used to help the augers cut.

First footing excavations were dug with a Barber-Greene excavator. While this equipment succeeded in digging three to four tower locations per day, it had the drawbacks of requiring considerable auxiliary labor and equipment and of being unable to handle larger than 6-in. boulders. It appeared, however, that were such a piece of equipment altered to dig a deeper hole, to give less spillage, and to carry the spoil farther from the hole, its efficiency for this work might be considerably improved.

Later, a tractor-type Byers clamshell-bucket crane was used. Set up in the center of a location, this equipment was in a position to dig all four holes and was able to average 2½ locations per day. Holes were dug near depth and hand-finished to grade stakes set by field engineers.

A second set of machines was moved up to set footings. These were normally pyramid-type, of steel, and were augmented with plates or stanchions where greater bearing area was required. Light footings were set with a small cat equipped with a short steel boom, while 5-ton four-wheel-drive trucks with A-frame booms set the heavier footings.

Efficiency of tower erection began with well-organized material supply. Fourteen yards were established at points convenient to transportation. Tower steel and other materials were stored there and moved to the job by truck.

To avoid confusion and wrong deliveries, material for one tower made up one truck load, steel for the lightest tower weighing 9,171 lb. exclusive of footings. Like pieces were tied together, making up bundles weighing 500 to 2,000 lb. Bills of material were prepared in printed form, there being one form for each type of tower. Material for one tower was stacked in the yard in a manner convenient for quick loading. Material was rechecked upon delivery in the field, the bill of material signed by the field man and mailed to the main office.

Tower Erection

Towers are of the standard wedge shape used generally on the Edison system. Minimum height of the Boulder towers is 78 ft. to the lower arm, with extensions of 6, 12, 18 and 24 ft. The four types of towers ranged in weight from 9,171 to 14,994 lb., excluding extensions and footings.

Base of the towers measured 24x26 ft. By the time material arrived in the field, footings had been set and the excavations back-filled with a bulldozer. Position tolerances of 1/100 ft. for line or grade were successfully met by checking with engineer's instrument and steel tape. Rotation was checked by using an 8-in. square bakelite template, graduated in degrees. In 880 tower locations, only three footings had to be reset.

Tower steel was assembled on the ground in sections, braced with a spreader bar to avoid distortion in lifting, and lifted into place with a Byers crane, equipped with a 75-ft. cedar boom having a maximum capacity of 1½ tons. The bridge was put on without resorting to a gin pole. An angle iron was turned out from the tower top to carry a block. The lift was then provided by a winch truck and the bridge shifted into position by hand.

By these means, a crew of 13 men, including foreman and truck driver could complete a tower in a day. Combined crews of 21 or 22 men completed three

to four locations per day, while in those locations where topography necessitated hand work, a crew completed a tower in a day and a half.

At the peak of operations, the line progressed at the rate of 2 mi. of foundations and 2 mi. of tower erection per day, while stringing of three conductors and two ground wires averaged a mile a day.

Stringing

Machines moved in for the stringing operation too, and a scheme for pre-stretching the conductors by means of a bulldozer proved more economical and satisfactory than any method of dead-man construction.

A 42,000-lb. bulldozer was equipped with a special framework on the forward end. A beam of rectangular section was welded together out of heavy flat steel pieces and attached to the bulldozer trunnions by tension members of 1x6-in. steel. Three pairs of eyelets were fashioned from 1½-in. steel and were slid over and welded to the beam. One eye in each pair was to accommodate the block, and the other the dead end.

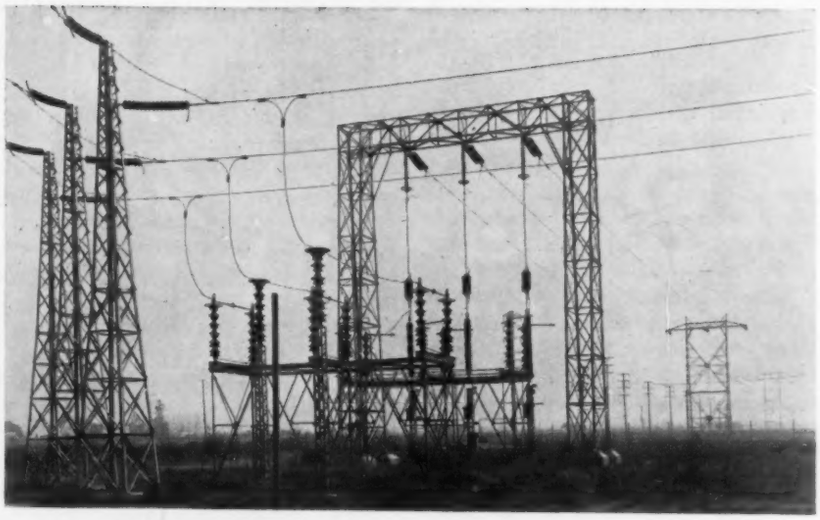
One such bulldozer, of which two were used, was run in line with the towers so its blade dug into the ground. Blocks were then attached, conductors pulled up to tension (16,000 lb.) in turn and held by dead-ending to the matching eye with a come-along. Stability of the bulldozer satisfactorily exceeded the 48,000-lb. combined tension of the pre-stretched conductors.

Other Equipment

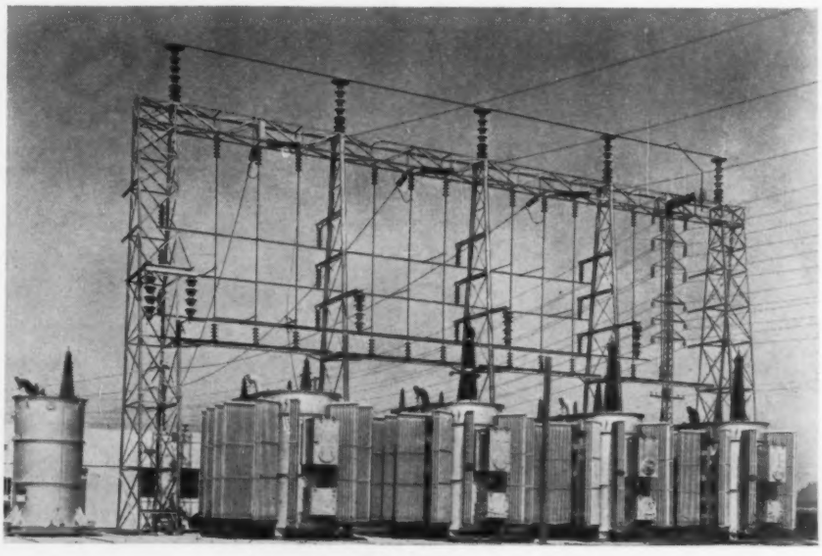
Where tower-footing resistances exceeded 100 ohms, two radial counterpoises (parallel to the line in both directions) were placed. Each consisted of four ½-in., 7-strand, galvanized-steel cables, 200 ft. long, buried from 1½ to 2 ft. deep in the same trench. For the 54 towers where counterpoises were installed, average footing resistance was reduced to 9.3 ohms, and none exceeded 70 ohms.

Studies led to the specifying of two overhead ground wires. These are situated midway between, and at an average height of 20 ft. above the conductors. It was estimated that lightning could be expected to produce less than one flashover a year with this protection. Each is a ½-in., 7-strand, zinc-coated, extra-high-strength steel wire.

Insulators are 10-in. diam., 5¾-in. spacing, heavy-section, ball-and-socket, suspension type. In suspension strings, 15 units of 15,000-lb. rating are employed. Two 16-unit strings are used at dead ends. In areas of heavy loading,

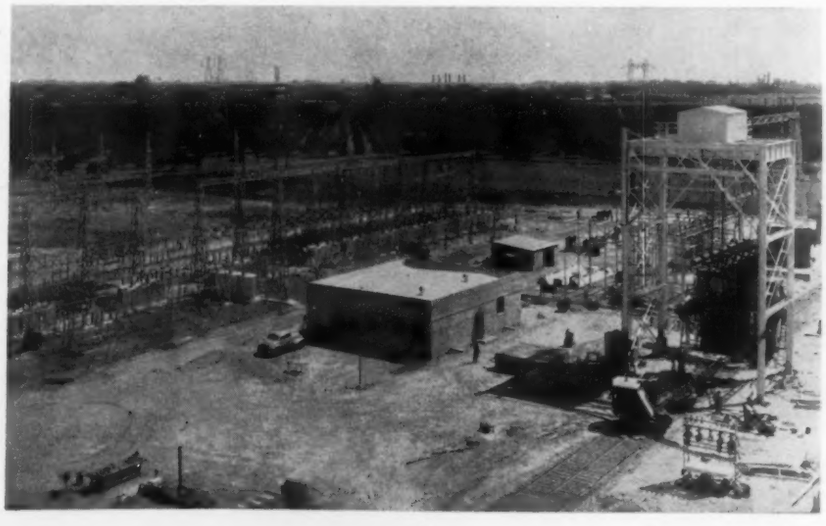


Simplicity characteristic of entire line is evident in dead-end rack and bus at Chino



At Chino (above) is half the receiving capacity. The 220/66-kv. single-phase transformers are 25,000 kva. each. At left is the G-E Petersen coil rated 100-135 amp.

Barre (below) is 26 mi. beyond, has same receiving facilities. Both stations have 50,000-kva. Westinghouse synchronous condensers; 66/11-kv. facilities at Barre total 30,000 kva.



strength is increased to 25,000 lb. at dead ends and peak suspension positions.

Protection

The fact that the Boulder line was not to be metallically interconnected but was to be operated as a separate electrical unit made it especially adaptable to Petersen-coil protection. By application of Petersen coils, or ground fault-neutralizers, it became possible to make the single-circuit line approach the double-circuit line in performance. Yet the investment so represented was less than 5% of what the cost of a second line would have been.

These neutralizers are installed at Boulder, and at Chino and Barre substations, and are designed to pass, during a line-to-ground fault, enough lagging current to compensate the leading charging current in the fault. This is calculated at 314 amp.

The units at Chino and Barre have a current range of 100-135 amp. each, at 50 cycles, each being designed to compensate for one-third of the line. The one at Boulder, which is one of the largest reactors ever built, has a double winding on a single magnetic core. Each winding is designed to compensate for one-third the entire length of line so the Boulder operator can retune the line simply by switching in the second winding in case either Chino or Barre is out of service.

The overhead ground wires are expected to reduce flashovers to single line-to-ground faults which will be suppressed by the ground-fault neutralizers.

Permanent ground faults, instead of being immediately removed (with considerable shock to the system which thus would have rejected 165,000 kw. of incoming power) are to be allowed to remain on the line while load is picked up by other plants. The neutralizers are designed to carry rated current for 10 min.

In addition, the line is protected by 4-element, instantaneous-over-current relays, and by double-element, balanced-current relays.

In the first, one element operates on residual currents to open breakers at each end of the line, a situation which would arise should a phase-to-ground fault occur when the ground-fault-neutralizers were short circuited. The other three elements operate on phase currents to open the line at one end if a phase-to-phase fault occurs near that end.

To open the opposite end of the line, and to clear the line when a phase-to-phase fault occurs near the center, the double-element relays are employed, there being three at each end. These are adjusted to trip when phase current in one element exceeds that in the other by 10%.

Completion

Without fanfare, the line was completed May 5, 1939 and energized May 12. Tuning and testing followed. On a windless May 14, eight arcing faults to ground were applied to the line as tests. They were suppressed with no system disturbance or oil-circuit-breaker operations in times varying from 0.86 to 3.76 sec. The line was placed in operation June 22.

Between that date and January 1, this year, the line transmitted 566.9 million kw.-hr. During that period there was experienced one case of line trouble, which was cleared within 30 cycles. The new source of power has been incorporated into the Edison system on a revised basis of protecting the system as a whole. In case of trouble, the system is segregated so that the east end and Orange County are carried on the Boulder plant.

A list of names would be almost certain to omit someone who played an important part in the building of this line. Suffice it to say that all work in connection with design and construction was under the direct supervision of H. W. Tice, Edison's assistant manager of operation.

It is only in the details of construction and the record of operation that the full measure of accomplishment is found. These are not facts likely to catch the public eye. But unobtrusive as the job was, it is on the record as another milepost in technical accomplishment and engineering skill.

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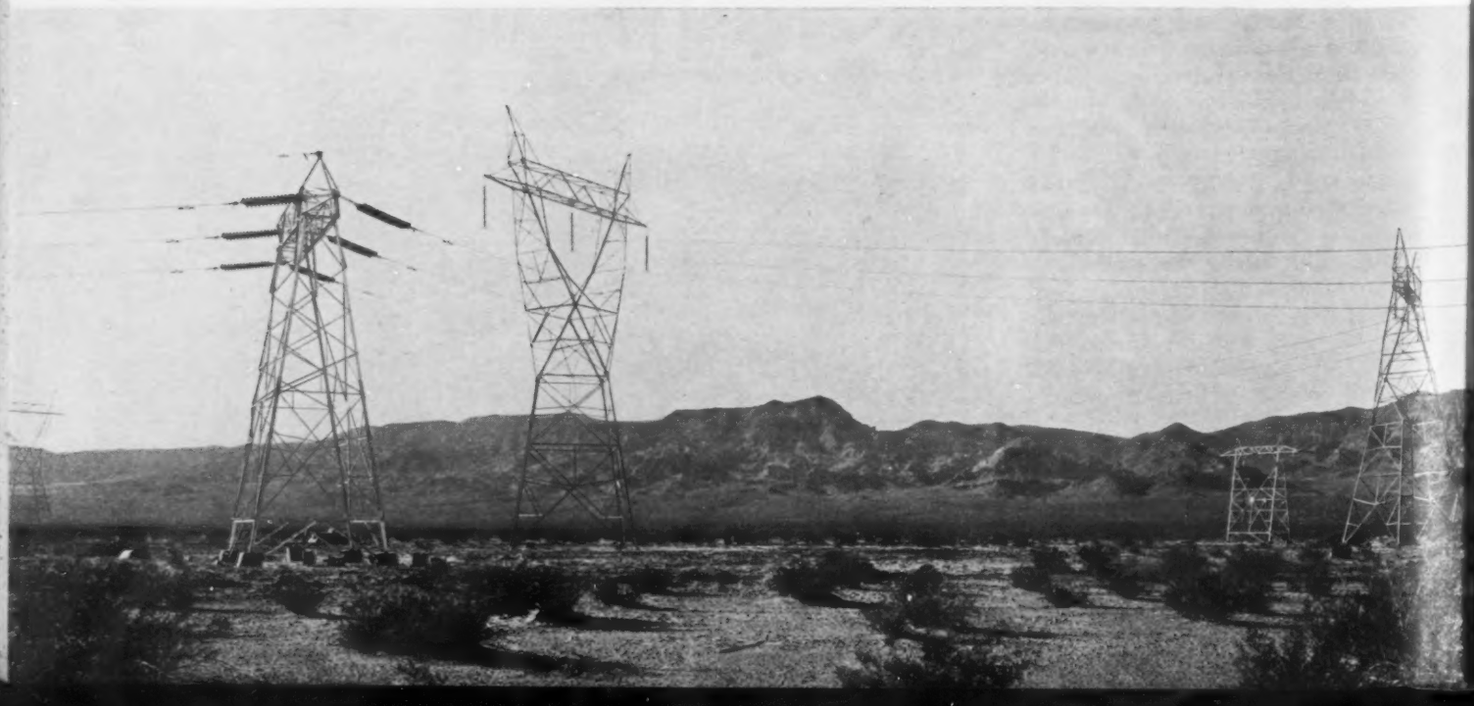
The point where Edison's line crosses under two 287-kv. circuits of the Los Angeles Bureau of Power & Light



Light Sells Clothes For Bond

Two new stores in Oakland and San Francisco use modernized lighting plans to merchandise men's apparel

LIGHT is definitely an aid to selling. The smart merchants recognize this selling aid and use it extensively. This was illustrated in San Francisco and Oakland when Bond Clothing Co. broke into these two already well supplied men's clothing markets with new stores to go after a share of such business aggressively.

The main floor lighting plan consists of three long oval panels, which are in reality "beam drops" suspended a few inches below the ceiling. Each of these panels carries eight semi-flush Wuelker lighting units. Each unit has a 12-in. square Fresnel lens with 4-in. sides of flashed opal glass, concealing a 500-watt lamp. This arrangement of

High intensities are provided by the semi- and full in-built lighting units in this new Bond store in San Francisco. No glare from overhead helps salesmen sell clothes "indoors," by showing true texture of merchandise. Entire installation involves 100,000 watts in bulb capacity

Taking over old buildings formerly occupied by similar businesses their modernization program to launch the new enterprise made spectacular use of light as one of the vital factors in attracting trade. Although the reconstructed building in San Francisco has many odd spaces beneath and around mezzanine and pillars, and behind stairways, etc., light is evenly distributed over the whole main floor and into every corner. No glare from overhead interferes with the ability of the customers to see for themselves not only the color, but the texture of the merchandise to be sold—a very important item in clothing store illumination.

24 units provides a total capacity of 12,000 watts as the foundation upon which the entire lighting plan is based. Zeon tube lights concealed along the upper edges of the "beam drop" panels assist in the general lighting scheme for the ceiling itself.

In-built Wuelker units under and above the mezzanine, which surrounds the main floor, carry 126 lamps of 200 watts each, having 10-inch circular Fresnel lenses. Concealed overhead units of various wattages illuminate niches and mirror coves, doorways, and many other parts of the store not usually illuminated, facilitating speed and convenience in handling of merchandise. Tubular lighting concealed in horizontal, semi-cylindrical troughs, gives the display counters additional efficiency and sales appeal. Show-window illumination consists of 106 in-built units, each having a 300-watt lamp.

The second floor lighting scheme follows that of the main floor in so far as possible, with 46 in-built units, using 300-watt lamps and 12-in. square Fresnel lenses.

Counting many other lighting facilities in the basement, workrooms, elevators, and other parts of the building, the entire installation involves approximately 100,000 watts in bulb capacity. Foot candle readings on the floor average as follows: Beneath the panels on main floor 75; under mezzanine 45; second floor 45. Edw. J. Lynch Electric Co. was the electrical contractor.

Canning

Fluorescent units help grading in western canneries

In asparagus canning, grading by color plays an important role. Under normal incandescent lighting, grading has been difficult, but recent experiments with fluorescent units may be the solution to this problem. This experimental work was begun by Frank Herrick, chief engineer of the Minnesota Valley Canning Co., and was carried on at LeSeur, Minn., with assistance from General Electric and Pacific Power & Light Co.

Installation in the Dayton, Wash. plant of the Blue Mountain Canneries, Inc., has proved so successful that this type of light is now used exclusively. Fifty lamps are used, each with 30-watt capacity, 36 in. long. Condensers were provided to yield a power factor of 70 per cent.

Sorting is done by workers who select the choice stalks for fancy pack from a wide rubber belt which carried the vegetable past them. The lights, installed just overhead, produce 110 ft.-candles on the sorting belt.

● SAVE YOUR VISION WEEK this year will be observed March 10-16 throughout the United States, presenting a opportunity for all electric utilities to focus public interest upon the great benefits of better vision. Such a concentrated drive is being backed heavily by the National Better Light Better Sight Bureau, New York. Window and counter cards, envelop stuffers, posters, radio shorts and other material and suggestions are being furnished by the Bureau to all who wish to do their share in helping to make Save Your Vision Week a real success.

"You Sell, I'll Install"

Jack Tennent of Yakima sells appliance dealers an idea and gets their business

BEFORE Jack Tennent bought an electrical store and shop in Yakima, Wash., nine years ago, he had looked around the town thoroughly before he made up his mind. There were several contractor-dealer shops, but he realized that there was no shop that specialized in wiring and fixtures. All of these were in competition with stores handling electrical appliances and consequently were not getting any business from the appliance dealers. Tennent decided to get rid of his own appliance stock and see if he could not become a service and installation contractor for these appliance people.

Yakima was surprised by the large ads he ran, clearing out the appliances. In big type he declared that the public could buy fine appliances elsewhere from any number of good local dealers. He would be glad to do the wiring and installation and sell the public fixtures for lighting.

Dealers, of course, were skeptical. Was there a catch to it? But people they sent to Tennent to try to buy refrigerators were asked politely to shop at local dealers. Finding Tennent in earnest they began to turn over installation business to him, sure that he would not try to cut in with appliances of his own. That he nearly always sold some extra outlets and perhaps new lighting fixtures did not actually put him in competition with them. They preferred doing wiring installation business with an established firm rather than the back-alley contractor.

Paul B. Creamer, Jack Tennent's partner, is in charge of the outside wiring and the shop. Tennent himself is the outside salesman and business getter. Mrs. Tennent keeps the store and its up-to-date stock of lighting fixtures and equipment in perfect cleanliness and order. The entire store is designed to demonstrate lighting fixtures and their uses, as the accompanying pictures show. Even window displays are of lighting equipment. Only a few table appliances are carried in stock, and only of the highest quality.

Upstairs on a mezzanine over the windows is the main fixture room. Here a customer can be taken away from the distractions of the store, seated comfortably, and demonstrated the fixtures hung and lighted on the ceiling. Niches along one side group together matched bathroom and bracket fixtures.

In the rear upstairs is the lamp and shade stock and the estimating room and sign planning department. As agent for a neon sign, this business is important to a specialist in lighting like Tennent.

The wiring shop downstairs at the rear, with an alley entrance, is just as orderly and well arranged as the front store and virtually as clean. Parts and fittings are kept in neatly labeled bins, wire coiled on pin racks along one side. Tools are kept in a wire mesh enclosed tool room. Motors are repaired here, for the business is one of installation and electric signs.

In preparing an estimate or a bid for a customer, Jack Tennent encloses with it always a little handbill in which

(Top down) Tennent has fixtures arranged in rows that can be switched on in groups for demonstration. (2) Main fixture display is on mezzanine, where prospects may sit in comfortable chairs and discuss fixtures they need. (3) Grouped together in a series of niches are matching bathroom and bracket type of fixtures. (4) While demonstrating an angle bracket commercial lighting unit, Tennent spotlights a lighting fixture on display. (5) A new reflector-type lamp is used to spotlight a group of bed lamps in a corner. (6) Shop at rear is as tidy as front of store

he stresses the enjoyment of comfort in a well-wired job. He urges the customer to make out a drawing or plan, to use such a diagram if he is calling for other bids, and to ask the inspector to check up for him to see that he gets what he has asked for. When he can contact the owner. Tennant uses the cut-outs and floor plans to help his prospect plan outlets for convenience in respect to furniture. By taking advantage of such sales helps, Tennent Electric Co. of Yakima sells more than the minimum wiring jobs and a good bill of fixtures on every installation.

Interior decorative lighting fixtures of "Cel-O-Glass" acetate plastic-covered, wire mesh were used in the Agricultural Building at the Los Angeles County Fair. The center fixture, 760 ft. long, is claimed to be the longest lighting fixture in the world, according to Fair officials

Lighting Forums

Western Institute of Light sponsors series of meetings

Newest developments in commercial lighting are being brought to the attention of residents of five Southern Californa cities at a series of free lighting forums sponsored by the Western Institute of Light and Vision in cooperation with the Southern California section of the Illuminating Engineering Society and the physics department of the Univ. of Southern California.

Four meetings on successive Monday nights are held in each town. Two speakers appear on each program, and special emphasis is laid on practical demonstrations to add interest to the lecture presentation. Meetings began in Santa Ana on Feb. 12, in Long Beach Feb. 19, Santa Monica Feb. 26, Ventura March 4 and Santa Barbara March 11. Local sponsors have been added in various towns, as follows: Santa Monica, Santa Monica public schools and the Southern California Edison Co.,; Long Beach, adult education department of the Long Beach city schools; Santa Barbara, Edison Co.; Santa Ana, adult education department of the Santa Ana city schools; Ventura, Ventura county chapter of the Building Contractors Assn. of California.

Speakers were: First meeting, Frank A. Hansen, managing director, Western Institute of Light and Vision, "Lighting: Causes and Effects." Dr. A. W. Nye, head of physics department, Univ. of Southern California, "Principles of Light."

Second meeting, Alston Rodgers, South Pacific division engineer, General Electric Lamp Dept., "Light's Newest Sources." John T. Shannon, manager, Keese Engineering Co., "Putting Light to Work."

Third meeting, Francis Falge, illuminating engineer, General Electric Lamp Dept., "Stage Lighting Effects." Gene Kornman, head portrait photographer, Twentieth Century-Fox Studios, "Photographic Lighting."

Fourth meeting, Gene Burke, designer of store interiors, "Light for Selling." G. M. Rankin, director of lighting, Edison Co., "Progress in Illumination."

This is the fourth in a series of annual lighting forums which have been held in Southern California under the auspices of the Western Institute of Light and Vision. This type of presentation has proved very successful in bringing the story of good lighting to the public, according to Institute Director Hansen.

A total of 336 S & M Flood-Lites are mounted on a catwalk at Grand Coulee, lighting up this largest man-made structure at night, and providing ample illumination for accurate work on the project. A Flood-Lite has been placed every 10 ft. along the 4,000 ft. suspension over the Columbia

Puget Sound Award

Home Economics Dept. places second in national contest

Puget Sound Power & Light Co.'s department of home economics, under direction of Edith T. Rauch, director, has been proclaimed the second best in the recent national campaign for improvement of lighting in American homes. The campaign, carried out last October, November, and December, resulted in improvement of light conditions in more than 10,000 farm and city homes in Western and Central Washington.

The campaign was carried out in cooperation with electrical appliance dealers and wiring contractors. All company representatives assisted with promotional activities and demonstrations. Seventeen young women in Mrs. Rauch's department gave demonstrations, including light volume measurements and suggestions for lighting improvements in 1,578 homes.

ELECTRICAL WEST

The All-Industry Magazine of Progress

Established 1887 and Incorporating the "Electrical Journal," "Journal of Electricity, Power & Gas" and "Journal of Electricity"

McGRAW-HILL COMPANY OF CALIFORNIA
68 Post Street, San Francisco

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Case for the Wholesaler

"EVERYTHING we now buy for resale is purchased through the jobber . . . We believe that such a practice is a good thing for the industry." A power company commercial manager made that statement. If every utility, every contractor and every retailer followed the procedure set forth, the lot of the wholesaler would be a happy one. Unfortunately they do not. Instead they by-pass or ignore this important link in the distribution chain. To make matters worse the wholesaler is being pointed to by public critic and governmental agency alike as being an unessential and costly functionary. Furthermore, between 10 and 20 per cent of the volume which normally flowed through regular wholesaling channels has been diverted to national mail order chains or cooperatives.

One of the principal reasons for this trend is that the essential and economical functions of the wholesaler are being overlooked or forgotten. His importance in the distribution chain is as great today as it ever was. In the long run, he saves money for the buyer of electrical supplies and appliances as well as for the manufacturer who makes these items. Here, briefly, are some of the services the wholesaler performs for the buyer. He maintains displays of new and improved products which may be examined at will. He simplifies purchasing procedure because there are fewer orders to write, fewer invoices to check and fewer incoming shipments to handle. He furnishes immediate price and catalog information. There are no credit delays when his services are utilized.

The wholesaler reduces hidden costs in carrying stocks by eliminating depreciation and obsolescence. Investments in heavy stocks and in costly floor space to carry them are not necessary for his patrons. He eliminates taxes and insurance costs, freight and cartage charges.

Especially valuable are his services to the contractor. He reduces estimating costs and functions as an expert purchasing agent. He delivers on schedule and can meet emergency demands. He furnishes specialized sales assistance. He eliminates handling costs and finally, he supplies quality products.

The manufacturer who utilizes the wholesaler's services also profits. He is saved the expense of warehousing. The wholesaler provides him economical and intensive sales coverage, particularly here in the Far West with its wide-open spaces and expensive travel. The handling of orders and inquiries is simplified. Accounting and collection costs are reduced. So are packing and shipping costs. Finally the wholesaler simplifies the manufacturers' production problem by regular ordering and intimate contact with the market.

Perhaps the wholesaler has been derelict in telling this institutional story. However, the arguments cited are ample justification for patronizing and supporting him. The wholesaler is a vital factor in maintaining and promoting the solidarity of the whole electrical industry. He merits greater and more continuous patronage. As the utility commercial manager said, ". . . such a practice is a good thing for the industry."

Kitchen Plans Sell

WHENEVER a utility reviews its sales costs and wonders whether the furnishing of kitchen plans to the public is profitable, it should remember that a kitchen plan becomes a traveling salesman for electricity. The happy customer receiving such a service just must show it to everybody. Even if such a walking billboard of electric kitchen appliances costs $10 or $15 each to produce, which it seldom does, it still would be one of the cheapest and most effective advertising mediums the company ever used. It is as potent as a window display and probably costs less than a good one. Such a kitchen plan, in color, carries its own salesman along with it—the customer himself or herself—to sell it to others.

As a goodwill builder, it has few peers also,

because hardly any other service the utility performs is so obvious and personal. Nor does any other produce the enthusiastic customers who are boosters for the company. The kitchen plan also is about the strongest wedge available to introduce new wiring into old homes. In many instances it is the only wedge that will pry open the door. It is surprising that so few utilities have made use of this effective selling aid. Those which have are enthusiastic. Those which have not will find that a kitchen-planning bureau will be a profitable producer of personally conducted advertisements for electric service in the home.

Advertising Follow-up

GREAT as is the power of advertising, there are times when it is expected to accomplish the impossible, or when it is blamed for not producing the expected results. A recent experience of a Western power company commercial department proves that the fault lies not with advertising but with the followup. Here is what happened:

Two fine mailing pieces were sent to 530 industrial electric customers at 30-day intervals. Each was accompanied by a return postage-paid card which requested that a representative of the power company call and discuss the subject presented in greater detail. The number of cards returned was negligible and the campaign was about to be classed as a failure when someone suggested that each customer be followed by telephone. The results of the telephone follow-up were electrifying in more ways than one. The conversation was about as follows: "Had they received the mailing pieces?" "Yes." "Were they interested in further information?"

Of the 490 customers who were called, 126 said "Yes." Most of them intended to send the cards but had mislaid or overlooked them. When a salesman presented the proposition in detail, 35 customers purchased installations of the equipment described. Furthermore, 45 are still considered as reasonably sure prospects for future installations.

There is more than just a simple moral is this recitation of facts. There is a suggestion as to ways and means of making advertising more effective.

Lighting Conference

SCHEDULING of the first annual Pacific Coast lighting Conference under the sponsorship of the Illuminating Engineering Society, as reported elsewhere in this issue, sets a precedent that lighting men look to with favor. The IES is one of the last professional societies to recognize the peculiar conditions that make separate Coast meetings desirable and profitable. Other societies such as the AIEE, have long since provided their memberships with forums in the form of distinct Pacific Coast conventions.

In many respects the Pacific Coast territory is an autonomous region. Certainly it is remote from Eastern and Middle Western population centers and the cost of attending conventions and meetings there virtually prohibits the attendance of all but a very select few. Moreover, there are many problems indigenous to this Western region that warrant special study and investigation. Other reasons might be cited to indicate why meetings specifically limited to this area are essential.

Now that the IES has recognized this need, it behooves those interested in the lighting field to demonstrate their appreciation by making this first meeting successful. Managements should see to it that men are authorized to attend from all sections of the West, both because of the excellent program and to assure the continuation of such annual conferences. Certainly the whole field of illumination is so full of promise for future business that meetings of this kind will more than repay the time and effort necessary to attend them.

Iron is Not Steel

SOMEWHAT carried away last month was the daily and periodical press—and even some national financial columnists who should know better—over the birth of a steel industry in the Northwest. Occasion for this excitement was the signing of a contract between the Bonneville Administration and Sierra Iron Co., a newly formed Nevada corporation.

Those who examined the situation more closely saw that what Sierra Iron Co. proposes to do is not make steel, but iron, and that the demand for 30,000 kw.—a figure which was loosely used to signify the proportions of the contract—is problematical, not real.

As an indusrial experiment, Sierra's operation will be watched with keen interest. The company proposes to reduce northwestern iron ore in a Greene furnace, which is expected to operate on much less coking coal by substituting electric heat. What Sierra has to do is build its first furnace, make it work, and then step its production up to 100 tons per day, at which rate 6,000 kw. would be required. The installation of two 200-ton units is contemplated as a further step once the foregoing have been successfully accomplished. The reduction process will be new to the United States.

The West needs industrial development, as this may prove to be. But over-enthusiastic or premature publicity will not help us toward that end.

Real Need For Rewiring On Western Farms

Rural homes in West should be able to provide full benefits of electricity

By Hobart Beresford*

In the Western states where we have had farm electric service for so long, there is probably more need for rewiring in rural electric development than for any other immediate activity. A great number of farms have been electrified for a number of years. On most of them, particularly those in the 10-15-year category, the rewiring problem is the one thing that stands in the way of further profitable use of electricity in agricultural production. This means that the inadequate wiring is a hindrance to the productive use of electricity in agriculture because the old wiring makes electricity inconvenient to use and gives uneconomical results from the appliances that are operated at sub-standard voltage or interrupted service.

The problem of rewiring is simply the problem of wiring over again. This time, however, everyone has had considerable experience with the use of electricity and has a better idea as to where outlets are needed most. Rewiring comes with the appreciation of the fact that the main feeder wires of the distribution system do not have sufficient capacity to take care of the various uses of electricity and the need for additional circuit capacity required by motors, lighting equipment and heating applications that make for the productive use of electricity in agriculture, which were unknown before experience with electric service.

Convenience Outlets

The first need for additional service is usually for convenience outlets in the house. Regardless of the care exercised in planning for electric service, every home finds that additional outlets are needed in the kitchen, the bathroom, the basement, and the back porch. One of the most neglected places for the installation of convenience outlets is the outside of the house. Many times the house is wired with a system that is adequate for the service inside, but the porch outlets and the side-of-the-house outlets, where it would be convenient to plug in the hotbed or soil-heating cable for plant stimulation or de-icing roof gutters or to plug in the insect trap or electric lawn mower, are not available. Another place where convenience outlets are usually neglected is in the basement or workroom where the washing machine or mangle may have cords which must be stretched across the room to reach the outlet.

Service to the barn offers a possibility for rewiring. The addition of the milking machine motor to the power circuit, following the application of an electric motor to the water system, often results in an overloaded source of supply. When the milking machine is started and the pump motor comes on at the same time, difficulty with the circuit may be experienced. Low voltage due to small wires is frequently a reason for the failure of the milking machine to operate satisfactorily on a cold morning. The poultry light and brooder circuits also suggest rewiring, as does the installation of an electrically operated water heater and steam sterilizer.

Pride in Appearance

Another opportunity for rewiring arises from the fact that most people are proud of their buildings and farmstead plantings and because of appearance desire to have the overhead wires done away with. This necessitates the planning of an underground distribution system wherein many of the buildings could be rewired at the same time the main feeders are being installed. For underground work parkway cable can be used for the distribution of service from the central entrance pole on the driveway or wherever the transformer is located.

Every farmer is keenly aware of fire hazards, whether they result from electrical wiring, flues, heaters or carelessness of laborers and their smoking. This ever-constant fear of fire on the farm makes it possible to approach the rewiring needs of the farm through elimination of fire hazard by the use of new materials and circuits adequate for the desired load. Fire hazard, whether real or imaginary, exists in the mind of the farmer because of his long experience with the danger of oil- and gas-type lighting equipment. For this reason rewiring has a welcome approach whenever a fire hazard can be eliminated.

Another approach to the rewiring problem is the sale of new lighting fixtures and yard lights. Electric heating applications, farm refrigeration, poultry production applications and dairy applications all offer another approach to rewiring for the electric service required in modern agricultural production.

From the standpoint of the utility, rewiring means that more electric service will be sold and a satisfactory profit made for both the consumer and the utility. From the standpoint of the electrical contractor, rewiring offers a tremendous potential outlet for labor and materials which will be beneficial to the purchaser and can be sold at a profit to the contractor. The number of farms that could benefit economically from additional investment in rewiring is in the thousands and the investment required totals hundreds of thousands of dollars. The wiring of farms for adequate electric service should be a part of the planned program to provide the full benefits of the productive use of electricity in agriculture.

*Extracts from an address before the California CREA Rural Electric Short Course, University of California, Davis, Jan. 15-17, 1940.

Rural Report

State of Washington shows advance in farm electrification

That rural electrification in the state of Washington made a notable advance in 1939, is indicated in a report at the fifteenth annual meeting of the Washington Committee on the relation of electricity to agriculture, held in Seattle at the Olympic Hotel recently. This report showed a total of 7,883 new users.

J. L. Smith, secretary of the committee, and head of the department of agricultural engineering at Washington State College, declared that "electricity has done more for the farmer than anything he has had in generations. Washington farmers are using electricity in 125 different ways."

Various reports showed the number of uses, including that of artificial light for use in flower growing; effect of light on egg production. Research is being made by the Washington committee on economic feasibility of evaporative cooling systems where humidity is low and summer temperature soaring, Smith states, and he forecasts that the next large field for electricity on the farm would be that of air conditioning and refrigeration.

General Electric Meets Present Markets With Finest Line of Refrigerators Ever Built

AND

Sweeping Price Reductions!

We'll Do It Again in 1940!

General Electric dealers are prepared for today's markets. With an even finer line of models, at competitive prices—new outstanding sales features—adequate profit margins—and the public acceptance General Electric enjoys—*it's going to be another G-E year.*

MODEL B8-40

6.2 CU. FT.
MODEL LB-6B
with all-steel cabinet, famous G-E sealed-in-steel Thrift Unit, and other features—

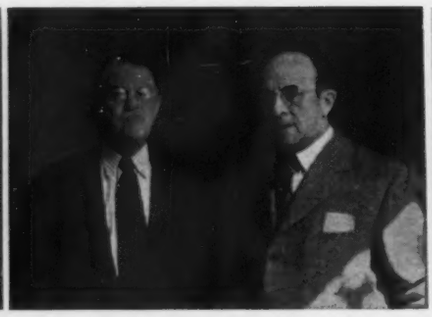
$114.75

Prices slightly higher in the south and west.

GENERAL ELECTRIC

PRINT IN BINDING

CLIF STRIKE EARL FISHER



BON CLARK CHAS. DOSTAL

W. E. SPRACKLING CHAS. GOOD

Preview at NEWA Gathering Shows 1940 Markets

POTENTIAL markets for 1940, relationship of the wholesaler to other branches of the industry and a sales campaign to justify the service of the wholesaler featured the program of the annual meeting of the Pacific Division, NEWA, held at Del Monte, Calif., Feb. 15-17. Attendance of 120 was the largest in recent years. F. C. Todt, Los Angeles district manager, G-E Supply Corp., was re-elected chairman of the division and D. A. Smith, Graham-Reynolds Electric Co., Los Angeles, was elected to the national executive committee.

Keen interest was shown in the institutional job of selling the services of the wholesaler described by N. J. McDonald, general sales manager of Thomas & Betts. He explained how the manufacturer has a real interest in the amount of business which the wholesaler is losing to national mail order houses, to cooperatives and because of direct selling, and then explained the campaign his company has undertaken to strengthen the wholesalers' position with the customer. As correctives he urged that wholesalers themselves undertake educational work with their own sales forces, engage in some form of institutional selling themselves and correct some of the practices which weaken their relationships with the manufacturers.

Potential markets due to the increasing effectiveness of the national Adequate Wiring program and in the field of lighting were discussed by W. E. Sprackling, vice-president, Anaconda Wire & Cable Co., and D. S. Youngholm, vice-president in charge of the lighting division of Westinghouse Electric & Mfg. Co. Sprackling showed how wiring inadequacy was penalizing every branch of the electrical industry and, incidentally, the customer most of all. Younholm contended that only 20% as much light as good practice justifies was being used by electrical customers and predicted that in the next few years the lighting market would triple.

Unique feature of the annual meeting is a session at which utility executives discuss problems in which the wholesaler has an interest as well as present a review of market conditions in their territories. R. E. Fisher, Pacific Gas & Electric Co. vice-president, told of the inroads of "bottled" or butane gas in rural areas which have been responsible for the loss of an estimated $5,000,000 of electrical business in the last two years. J. E. E. Royer, vice-president and general manager, Washington Water Power Co., Spokane, gave a realistic review of the federal power developments in the Pacific Northwest as they affect the electrical industry. Although 24 of the 39 counties in Washington have voted public power districts, these represent only 460,000 of the 1,580,000 population in the state and only nine are actually operating he declared. All depend upon so-called "cheap electricity" rather than sustained promotional efforts for their load-building he pointed out.

C. J. Strike, president, Idaho Power Co., Boise, emphasized the inter-relationship of all branches of the industry and stated that today "it is not sufficient to do a good job, you are obliged to prove it to win public recognition and goodwill." L. A. McArthur, vice-president, Pacific Power & Light Co., Portland, Ore., cited figures to show the relationship between average annual domestic consumption and appliance sales. Studies in his company's territory have shown that in order to raise the average consumption from 1,606 kw.-hr., the present level, to 2,600 kw.-hr. the highest figure for any division of his company, some $11,000,000 worth of appliances must be sold.

A summary of the Pacific Coast market as represented by consolidated reports from 31 utility systems was presented by George C. Tenney, editor of ELECTRICAL WEST. His analysis showed a 1940 market for appliances of $116,-

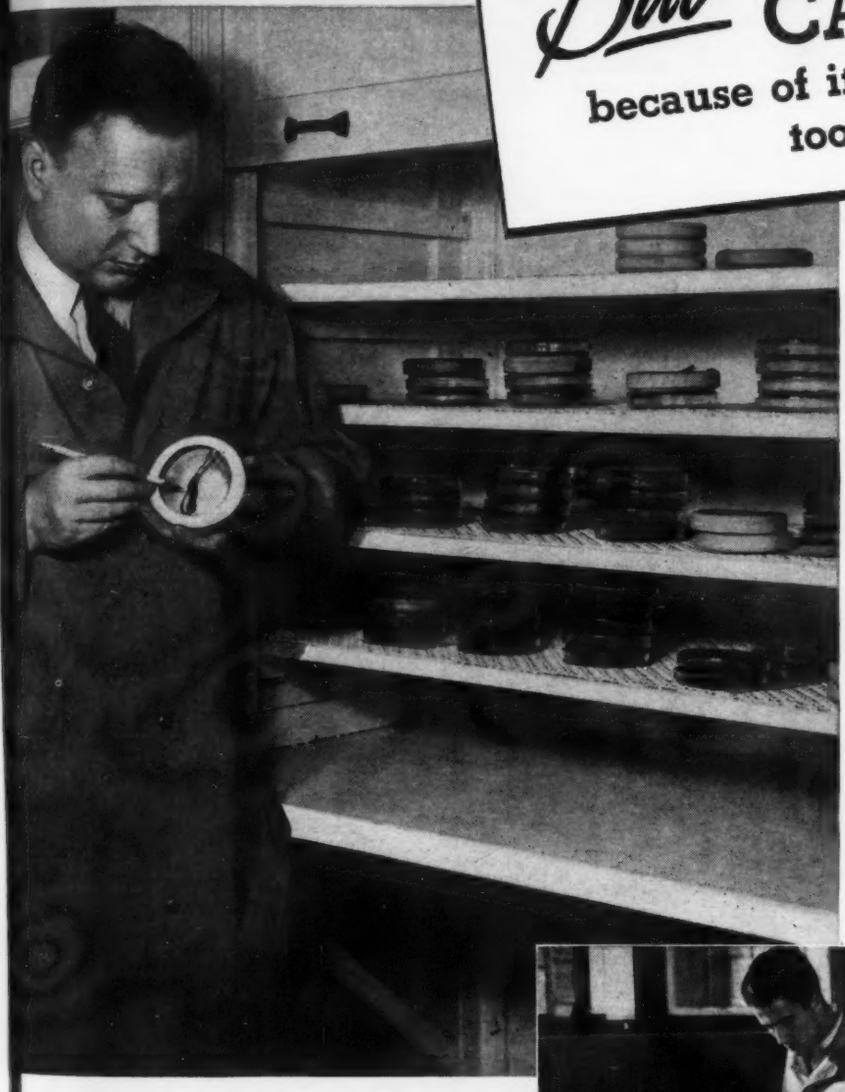
DAVE SMITH FRED TODT ED ROYER JOHN BUSEY

CHAETOMIUM GLOBOSUM

may be a stranger to you—

But CABLE FAILURE

because of it, is an acquaintance of too long standing



BACTERIOLOGY, too, is the concern of Anaconda research engineers. For, in their never ceasing pursuit of enemies to long life of cables, they have found an insidious saboteur in Chaetomium Globosum, one of a group of fungi and bacteria capable of destroying cable insulations and causing failures.

Laboratory methods include the culturing of Chaetomium Globosum, and other destructive organisms, then subjecting various fibrous insulating materials to their attack. When they fail to make a conquest, Anaconda engineers know they have an insulation immune to their depredations.

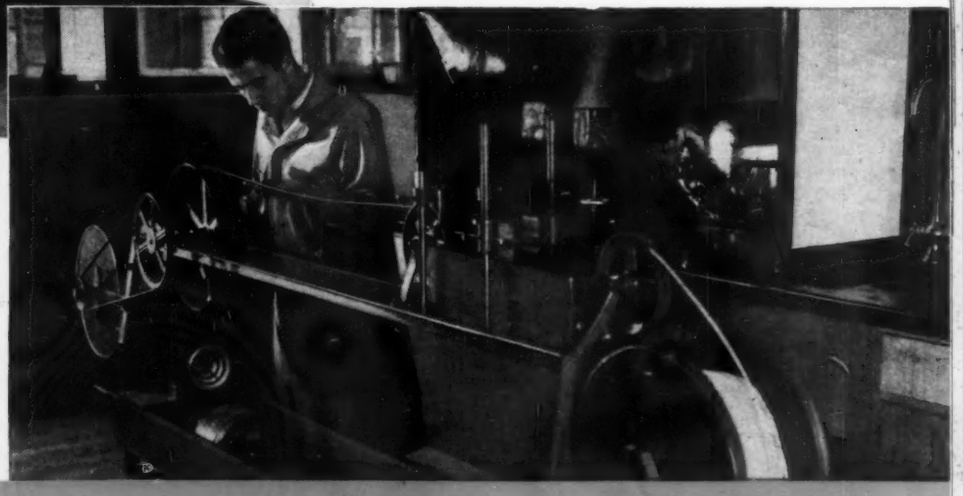
This is but one example of the service and protection that is being built into all wires and cables bearing the Anaconda trademark. 40849

ANACONDA
Know more by comparison

der very carefully controlled conditions samples variously treated fibrous materials are subjected the action of typical molds and bacteria.

•

ndreds of different compounds are run on aconda's experimental lines and materials must s most stringent tests before being put in service.



USE MODERN IMPROVED

Anaconda Wire & Cable

ANACONDA WIRE & CABLE COMPANY, General Offices: 25 Broadway, New York City; Chicago Office: 20 North Wacker Drive

Subsidiary of Anaconda Copper Mining Company. Sales Offices in Principal Cities

400,000 in the territory, up 9.2% from 1939, including 62,000 electric ranges, 31,500 electric water heaters and 254,500 electric refrigerators, representing increases over 1939 sales of 10.4%, 16.4% and 9.5% respectively. Utilities added 126,000 new farm and residential customers in 1939 and expected to better this fgure this year, he reported. Building prospects were reported as better than 1939 when permits in 50 far Western cities totaled $235,000,000 best figure since 1930.

R. J. Holtermann, Pacific Coast vice-president of Westinghouse Electric Supply Corp., paid a fitting tribute to the late Albert H. Elliot, secretary of the division since its formation in 1908, who died in January.

In the golf tournament the historic Copper Cup was wone by W. C. Figroid, manager of Gilson Electric Supply Co., Oakland. A. J. Cole, vice-president, Toastmaster Division, McGraw-Electric Co., won the Manufacturer's Cup., W. R. Marshall, vice-president Westinghouse Electric & Manufacturing Co., San Francisco, the Clendennin trophy and J. E. S. Royer, the Central Station Cup. C. W. Goodwin, San Francisco district manager G-E Supply Corp., presided at the annual golf dinner.

Agenda

Past and future activities of electrical leagues reported

Secretaries of associations in the electrical industry throughout the 11 Western States regularly check in on the doings of their various organizations. These programs include leagues from San Diego to Seattle to Denver.

Electric Club of San Diego—Met Feb. 6 to welcome new president, Gerald W. Heilbron, Heilbron Electric Co. Narrated motion picture presented by the Phelps Dodge Copper Products Corp. entitled "Copper—from mine to market." Chairman of the day was Francis Irwin, Coast Electric Co. On Feb. 16, Ladies Day was held. Percy Wyly, II, Federal Bureau of Investigation at San Diego, spoke on his activities in the region. Ray C. Cavell was chairman of the day.

Electric Club of Washington—Met at Artic Club Jan. 29 to hear Ted Bakeman, commercial and industrial promotional sales director for Puget Power. Bakeman showed slide pictures of lighting features employed at San Francisco Fair, and also discussed recent lighting developments. Feb. 12, Arthur Vander Sys, property manager for White & Bollard, Seattle, and president of the Seattle Real Estate Board, spoke on the "Real Estate Outlook for 1940."

Electrical Estimators, Los Angeles — Met Feb. 15, Chamber of Commerce Bldg., to hear Lt. A. R. Slimmon discuss "National Defense." C. F. Benjamin, Benjamin Electric Co., was program chairman. John Strickley is secretary of this organization.

EMEA—Southern California chapter—Met Feb. 20 for dinner. "The Question Box" was presented by Graham Holabird, district sales engineer, National Electric Products Co. Slides showing industrial application were shown. "More Goods for More People, with Automatic Electric Control," was presented by the General Electric Co. R. Glen Woods is president of the chapter.

IAEI—Central California chapter—Met Feb. 9 in Visalia civic auditorium to discuss inspector problems. C. T. Coyle, Fresno inspector and chapter chairman, presided. George Bowman, Fresno city electrician, talked on "Street Lighting." Horace S. Walling spoke on "Circuit Breakers and Panelboards." A motion picture, "Underwriters Approved," was shown by K. W. Keene, associate electrical engineer for Underwriters Laboratories, Inc.

IAEI—Southern California chapter—Meeting set for March 27 at Ontario, Calif. City Hall. Inspector problems will be discussed.

IES—San Francisco Bay Cities Section—Dinner held Feb. 15. Speaker was S. H. Hazelton, Jr., whose subject was "Photographic Lamps, Drying Lamps, Coffer Lights, Fluorescent Lamps and Their Application." Miss Goldien Marble, new home lighting advisor, PG and E, was honored guest.

NECA—Santa Barbara chapter—Met Feb. 8 for business meeting, Feb. 22 for both dinner and business get-together. Meetings for March are scheduled for 14th and 28th.

Northwest Electric Light & Power Assn.—Fifteenth Annual Meeting, Business Development Section, was conducted by General Pat Johnson at a Staff College in the Olympic Hotel, Seattle, Feb. 29 and March 1. Special conference sessions were conducted by J. A. Lockhart, F. M. Ingraham, J. B. Buman, J. S. Scott, John Dierdorff. Berkeley Snow is executive secretary of the association.

Rocky Mountain Electrical League—League's Adequate Wiring Bureau was host to Denver's building contractors and architects at a dinner at the Denver Athletic Club, Feb. 15. L. B. Johnson, General Electric Co., Salt Lake City, chairman of the Salt Lake Adequate Wiring organization, addressed the group. William Cyr, associate editor of ELECTRICAL WEST, has been conducting meetings throughout the League territory, presenting a sales-skit entitled "Gadgets Will Get You If You Don't Watch Out."

San Francisco Electrical Development League—Edison Day was held Feb. 12. Max Loewenthal, Ed Cutting and Frank Fagan, who all worked with Edison, told of their personal experiences during that time. R. A. Balzari was chairman of the day. Newly elected officers for 1940 are Ken Ryals, president, succeeding Clyde Allen; Clark Baker, secretary-treasurer (reelected). Directors named for two-year terms are I. W. Borda, Okonite Co.; R. J. Cobban, Westinghouse Electric & Mfg. Co., and Harold Mills. Director for a one-year term is Willard Nott, Sangamo Electric Co.

● STIMULATED by public demand, southern California builders are showing an ever-increasing interest in adequate wiring as a sales tool. Proof of their general acceptance has been their desire to identify themselves to the public as backers of the adequate wiring movement. Three of Los Angeles' largest domestic builders recently cooperated with the electric industry in the posting of a 24-sheet billboard in one of the newer residential tracts calling attention to adequate wiring.

Illuminating Eng'rs

Set new precedent with first Coast lighting conference

Recognition of the specialized developments in the far West has resulted in the scheduling of the first annual Pacific Coast Lighting Conference by the Illuminating Engineering Society, set for Los Angeles April 26 and 27. Sessions will be held in the Edison Building auditorium. Frank A. Hansen, director of the Western Institute of Light and Vision, is conference chairman and is arranging the program.

Utility and applicability of subject matter features the tentative program which includes sessions on exterior and interior illumination and a special conference on lighting sales.

FRIDAY, APRIL 26TH

Morning Session: Exterior Illumination
(Henry B. May, Jr., Chairman of Session)

1. HIGHWAY LIGHTING, By William P. Bear, Pacific Gas & Elec. Co., San Francisco.
2. SPECTACULAR LIGHTING IN SOUTHERN CALIFORNIA, By T. H. Shepherd, Bur. of P & L, Los Angeles.
3. LIGHTING AND ACCIDENTS, By Mr. Bankhead, Traffic Engineer, County of Los Angeles.
4. LIGHT FOR OUTDOOR PLAY, By Arthur M. Johnson, Engineer, S&M Lamp Co., Los Angeles.

Noon Luncheon: Hotel Biltmore

5. ADDRESS BY IES PRESIDENT LESTER H. GRAVES.

Afternoon Session: Interior Illumination
(Nathan H. Graves, Chairman of Session)

6. FLUORESCENT LIGHTING APPLICATIONS, By Francis M. Falge, Lamp Dept. of G-E. Co.
7. DESIGN FOR DAYLIGHT IN SCHOOL BUILDINGS, By Leland H. Brown, Stanford University.
8. ARTIFICIAL LIGHTING OF SCHOOLS, By Leonard A. Hobbs, Smoot-Holman Co., San Francisco.
9. LIGHTING OF PROFESSIONAL OFFICES, By Foster K. Sampson, So. Calif. Edison Co.
10. NEW DEVELOPMENTS (Demonstrations), By Alston Rodgers, Lamp Dept. of G-E. Co.

NOTE: Social activities are being planned for Friday evening, to include dinner, entertainment and dancing, with a minimum of speech-making or formality.

SATURDAY, APRIL 27TH

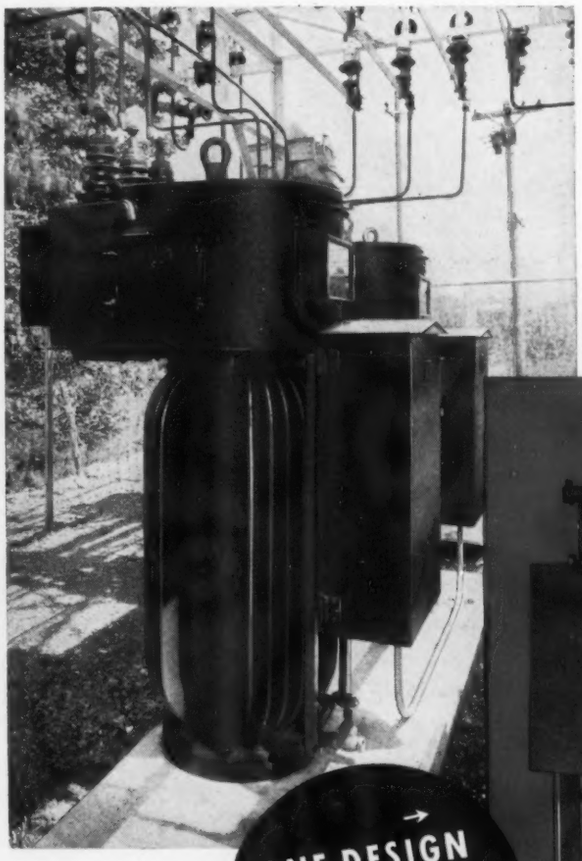
Morning Session: Conference on Lighting Sales
(C. T. Bakeman, Chairman of Session)

11. SUCCESSFUL SCHOOL LIGHTING EXPERIENCES, By A. I. Benedict, San Diego Cons. G. & E. Co.
12. THE EDUCATOR'S VIEWPOINT ON SCHOOL LIGHTING, By A. W. Ray, Supt. Sausalito Schools.
13. CO-OPERATIVE RELIGHTING OF DISTRICTS, By Lloyd A. Gates and Oscar W. Meissner, Bureau of Power and Light, Los Angeles.
14. WESTERN LIGHTING OPPORTUNITIES, By O. R. Doerr, Pacific Gas and Elec. Co.

● AN ADEQUATE WIRING BUREAU has been located in Sacramento to promote better wiring in new and old buildings. Members of this newly-founded Bureau are Frank Merwin, W. H. Welsh, C. H. Carter, Clifford Prudhomme, George Fay and Carl Anderson, secretary, PG and E.

TODAY

Feeder Voltage Regulation Is More Profitable than Ever



ONE DESIGN FOR INDOORS AND OUTDOORS

IN 1932, this installation of feeder regulators was made at a total cost of $4200.

Today, using the improved G-E induction voltage regulator, the cost would be only $3780—a saving of $420,or 10 per cent.

Even more important, the annual return on the investment would be 53 per cent of today's installed cost—based on the fact that the regulators would prevent the loss of 100,000 kilowatt-hours of revenue each year.

Along with lower costs have come improved design and performance. In the modern G-E induction regulator, dynamic braking has replaced mechanical brakes; external connections between units in three-phase installations have been eliminated; all controls are enclosed in a weatherproof cabinet; phase shifting is simply a matter of moving a plug from one receptacle to another. These and other features simplify installation and cut maintenance. For further information, just ask your G-E representative for Bulletin GEA-2985, or write General Electric Company, Schenectady, New York.

The Improved G-E Induction Voltage Regulator

Ratings: 36, 48, 60, 72, 96, and 120 kva, single phase, 60 cycles, 2400 volts and 4800 volts. G-E regulators in other ratings are available for profitable voltage regulation at any point on the system

GENERAL ELECTRIC

350-146

NEWS OF THE INDUSTRY

POWER LINE FROM PHOENIX TO PARKER DAM COMPLETED

Electric energy transmitted from Boulder Dam's power plant almost 300 miles away has averted the power shortage threatening Arizona's capital and environs, John C. Page, Commissioner, Bureau of Reclamation, reported last month to Secretary of the Interior Harold L. Ickes.

The 140-mile high-tension power line from Phoenix to Parker Dam, connecting there at a substation with another power line running up to Boulder more than 150 miles distant, has now been completed and is in active service.

The new line will supply sorely needed power for Phoenix homes as well as other towns and irrigated farms in central Arizona. Extended drought and small stream run-offs from the mountains had cut down the amount of hydroelectric energy available.

Power for the region is ordinarily supplied by the Salt River Valley Water Users' Assn., which is the organization operating the Salt River Valley Reclamation Project, and the Central Arizona Light and Power Co., a private utility. Low water in the Salt River Valley Project's reservoirs curtailed the output of the association's hydroelectric plants, however, and a possibly critical shortage had loomed.

The power generated at Boulder and now delivered via Parker Dam over the new line is power allotted to the Metropolitan Water District of Southern California, but unused by it owing to the fact that its Colorado River aqueduct pumping requirements at present leave a surplus available. The Salt River Valley Assn. has contracted to buy power from this surplus until a power plant now under construction at Parker Dam is completed.

After Parker's power plant is completed power will be delivered directly from Parker Dam instead of from Boulder, to the Phoenix area. Both the Salt River Valley Assn. and the Central Arizona Light and Power Co. have already entered into 20-year contracts with the Government to buy Parker-generated power when it is available for delivery.

The Boulder power now being delivered to the Salt River Association over the new line costs 1.63 mills per kw.-hr. the firm energy rate for Boulder power, plus a generating charge of 28c per month per kw. of maximum demand.

Parker Dam power, after completion of the plant, will sell for 1.9 mills per kw.-hr. plus $6,250 per month for a generating charge. However, the Central Arizona Light and Power Co. and the Salt River Assn. have each guaranteed a minimum annual payment for the power of $220,000 a year. Each is entitled to take up to the maximum rate of delivery of 30,000 kva. under their 20,-year contracts.

RUNAWAY SPOOL

A wild horse was claimed by Bonneville engineers to be responsible for the destructive roll of a two-ton spool of aluminum and steel power transmission cable down the side of a mountain north of Goldendale, Wash. The 4,000 ft. of wire, worth about $500, was said upon salvage, not to be suitable for transmission lines, but it will be used otherwise.

The horse, engineers said, probably nudged the spool down the hill after it had been placed for stringing in the Bonneville-Grand Coulee connecting line.

SEATTLE EXTENDS CONTRACT WITH TACOMA LIGHT SYSTEM

The Seattle City Council has approved a recommendation from the Board of Public Works that City Light extend its present power-interchange agreement into a reciprocal power-storage contract with Tacoma's municipal system. The Tacoma city officials have approved such a contract.

The most important provision of the new agreement provides that when either utility has a water surplus—Seattle on its Skagit development or Tacoma on its Lake Cushman project—and the other has a water shortage, the utility with the surplus will store its water and use it gradually to generate power for the utility with the shortage.

Other than the water storage provision, the changes in the contract have to do with price. The price of hydro generated power, exchanged between the two cities, will be cut from five mills per kw.-hr. to two mills per kw.-hr. Provision regarding exchange of steam-generated power is being changed to read so the price charged will be the actual cost of production, but not to exceed 1¼c per kw.-hr. At present, the price is 1¼c per kw.-hr. The Seattle-Tacoma inter-tie has been in operation for about 15 years, and has been extensively used, both cities benefitting at crucial periods.

TACOMA TO TIE IN WITH BONNEVILLE LATE THIS YEAR

Tacoma, Wash. and the Bonneville Power Administration entered into a 10 year agreement Feb. 21, for the interconnection of Tacoma's municipally owned power system with the Federal Bonneville network.

The agreement executed in Tacoma, will become effective immediately upon completion of necessary construction work—expected in the fall of 1940. Bonneville will build a 110,000 volt extension of its network to a connection point at Tacoma's city limits. The city will build a similar line from the connection point to its Tideflats substation.

Tacoma's light and power system, outstanding throughout the country for its low retail rates and successful municipal operation, has a generating capacity of approximately 140,000 kw. Bonneville's present capacity is 86,400 kw. Installation of two new generators early next year will more than double the present capacity.

"The Tacoma contract marks an important step in Bonneville's policy of implementing existing power resources in the northwest region." Bonneville Power Administrator Paul J. Raver commented. "The storage characteristics of Tacoma's hydroelectric system and the run-of-the-river characteristics of the Bonneville plant, make the interconnection of the two particularly advantageous to both parties.

"An interchange between the two systems has not only the advantage of emergency, or breakdown relief for both parties but will permit more economical operation through the firming up of both power supplies."

The Tacoma system has operated as a public-owned agency since 1893. It operates three hydroelectric generating plants, one on the Nisqually river and two in the Skokomish river watershed on the Olympic peninsula. Two steam plants are operated in the city for stand-by service. For the past 20 years the system has been under the direction of Ira S. Davisson, commissioner of public utilities. Verne Kent is superintendent.

SECOND INDUSTRIAL CONTRACT SIGNED BY BONNEVILLE

Sierra Iron Co., a Nevada corporation, has followed Aluminum Co. of America to Vancouver, Wash., by signing Bonneville's second large industrial contract. D. H. Botchford, Los Angeles, president of the company, and Bonne-

D *presents*

"A CHANGE FOR THE BETTER"

Directed BY An Alert Electrical Contractor

● The pictures tell an emphatic "before and after" story. A rapidly growing manufacturing company had not provided for increasing power and lighting requirements. As new circuits were needed, additional cabinets were added, one at a time. Eight are shown in the top photograph. Disorder and inefficiency became evident and—that's where an alert electrical contractor went into action. He showed the management the wisdom of a complete new Square D installation. The old wiring was ripped out and all the circuits were grouped in the two Square D Saflex panels shown in the lower photograph—a safe, compact, convenient and efficient installation.

● More and more electrical contractors are going after just such industrial jobs as this one. There are a lot of them. They produce substantial revenue and profit.

CALL IN A SQUARE D MAN

SQUARE D COMPANY

LOS ANGELES - MILWAUKEE - DETROIT

IN CANADA: SQUARE D COMPANY CANADA LIMITED, TORONTO, ONTARIO

HERE'S WHY G-E IS THE EASIEST RANGE TO SELL!

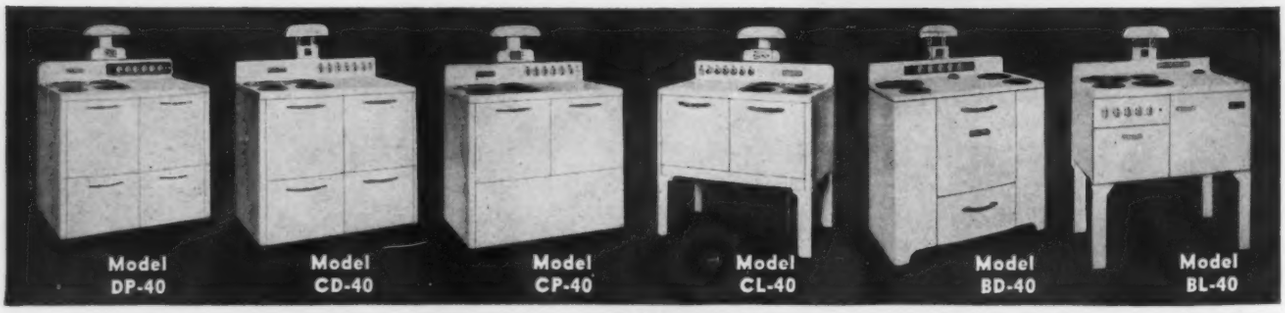
New G-E Electric Ranges on your display floor will automatically start many a sale. Their gleaming white beauty and advanced design are sure to attract immediate interest. And new G-E models cook faster and use less current than ever before! New CLEAN SPEED 5-Heat Calrod Units throughout, Tel-A-Cook lights in color, famous G-E Tripl-Oven, Broiler Meter, Automatic Oven Lighting, and dozens of other *salable* features.

NEW G-E "COOKING REBUS" MAKES A DRAMATIC DEMONSTRATION!

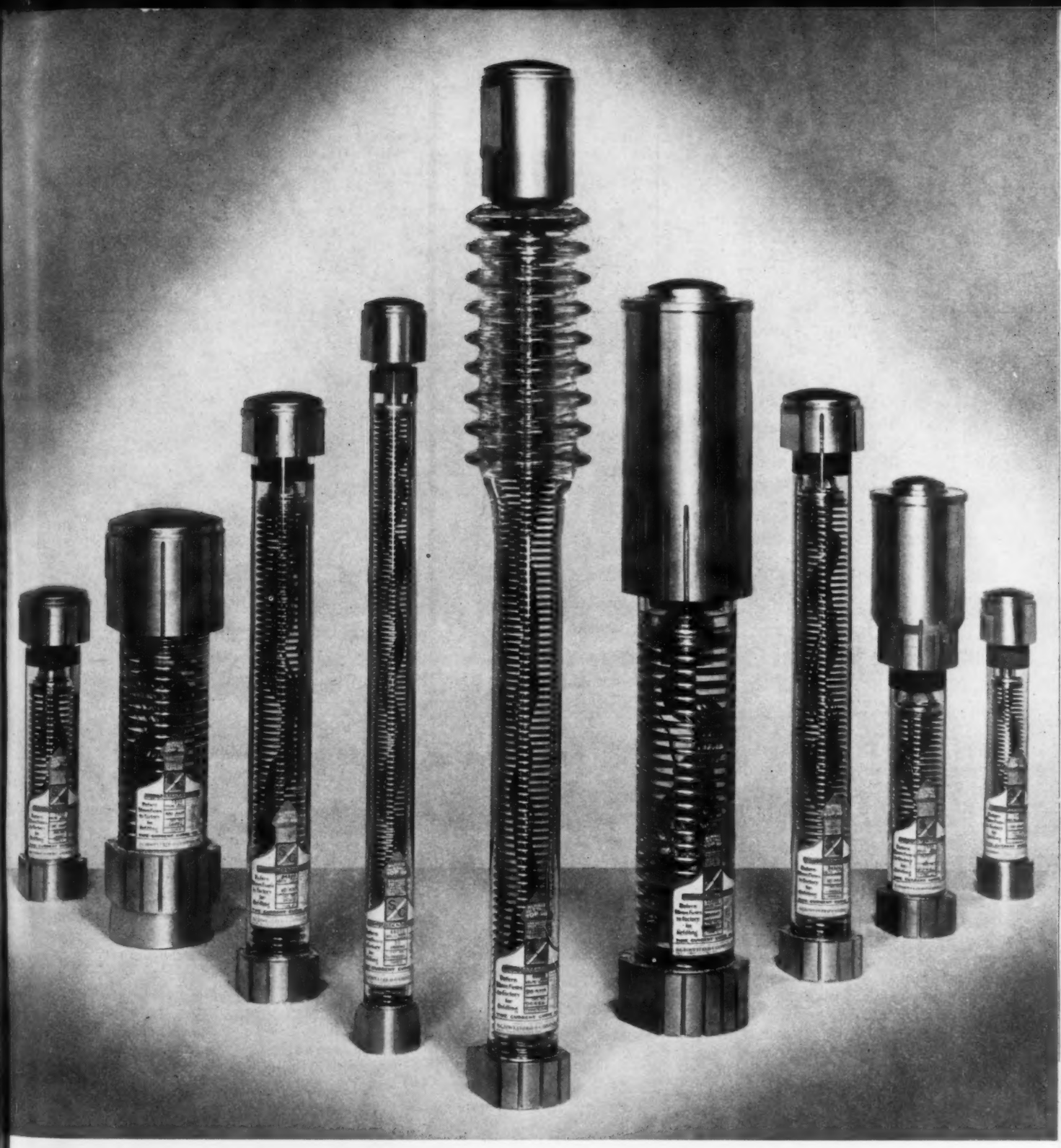
Here's a dramatic and easy way to tell the great G-E Range story. Pictures and "Props" show how the General Electric Range gives *ALL* the advantages of modern electric cooking. There's nothing like this startling new G-E "Cooking Rebus". It puts real showmanship into range selling.

CUT YOURSELF IN ON THE PROFITS!

General Electric Range dealers are out to break all previous sales and profit records. You can get a grand start with the big *G-E "Sale Blazers" Campaign* for April and May! "Cut yourself in on the profits" by phoning or wiring your G-E Distributor *today* for all details. General Electric Company, Appliance and Merchandise Department J-0233, Bridgeport, Connecticut.



GENERAL ELECTRIC



A Size and Type Fuse For Every Purpose

FOR indoor or outdoor service S & C Liquid Fuses cover such a wide range of application that there is a fuse available for distribution, transmission, station, and customer applications from 2300 to 138,000 volts and from ½ to 400 amperes.

Each S & C Fuse has built into it a uniformly high operating efficiency over the entire range of fault currents from the minimum blowing current up to the rated interrupting capacity.

For years the S & C Fuse has been a most dependable protective device; constant improvements have made it more so today than ever. There are more S & C Liquid Fuses being put into service today *than ever before.* SCHWEITZER & CONRAD, Inc., 4435 Ravenswood Avenue, Chicago, Illinois.

"EXPERIENCE WILL CHOOSE THE S&C FUSE"

WESTERN REPRESENTATIVES:

SAN FRANCISCO
George E. Honn, 420 Market Street

LOS ANGELES
Farnham & Cunningham, Edison Bldg.

SEATTLE
T. S. Wood, 220 Ninth Avenue, North

SALT LAKE CITY
Riter Engineering Co., Kearns Bldg.

ville Administrator Paul J. Raver signed a 20-year agreement late last month calling for delivery of successive blocks of Bonneville power up to 6000 kw. during next year and contemplated delivery of 30,000 kw. within two years.

The company, although it first planned to locate in Portland, obtained a 30-year lease. at $1 a year, for 23 acres from the Port of Vancouver. This land already filled lies behind Vancouver's terminal No. 2, adjacent to the city boundary.

Botchford said he expected to develop the plant to a capacity of 100 tons of pig iron a day before the end of 1940, and plans ultimately, on the basis of 30,000 kw. to produce 500 tons a day. The Bonneville contract requires delivery of 1,500 kw. not later than June 1, 1941.

The electrolytic method will be used to produce this pig iron tonnage. Electric furnaces will be installed by Albert E. Greene of Seattle, head of the Green Electric Furnace Co., who will be an active associate of the Sierra Iron Co.

OPEN SEASON on bobcats came last month for the line crew of the Southern Colorado Power Co. working on 22,000-volt line. Fred Snow and his crew here found two fine specimens, a male and a female, lying dead at the foot of a pole. They had but recently come in contact with the high-power line while playing on the arms and evidently died instantly, with only slight burns to show. Claw marks on the pole and the mark of a muddy paw on an insulator told the story

Bonneville To Buy West Coast Power Co. Line and Cable

Reviving a year and a half negotiation between the Bonneville Administration and West Coast Power Co., commenced by his predecessor, Dr. Paul J. Raver, Bonneville Administrator, recently closed a deal with the company to purchase 80 miles of 33,000 and 13,200-volt transmission lines in Pacific and Wahkiakum Counties, Wash., and a submarine cable across the Columbia River, for $155,000. This contract to purchase, which ran to March 1, is now before the Federal Power Commission for approval.

The Bonneville-West Coast deal is contingent on two other purchases of West Coast company's utility properties in that area, one by Pacific County PUD and one by Wahkiakum County PUD. Previous contracts between these PUDs and the company to purchase these properties expired Nov. 1, after it was found that the PUDs were unable to perform after nine months during which the orginal contract was renewed from month to month. *(See* ELECTRICAL WEST, Dec. 1939, page 56). The present deal has the effect of reinstating these original contracts to purchase.

Under the present terms of the agreement, Pacific County PUD will pay West Coast $300,000 for generating plants and distribution lines serving the Long Beach area in the southern portion of the county. Wahkiakum County PUD is to pay $120,000 for one generating plant and distribution lines serving the communities of Skamokowa, Cathlamet and Puget Island. The PUDs indicated they were in a position to make these purchases by Mar. 1.

A fourth step in the deal is the agreement by Pacific County PUD to buy from Bonneville for $33,750 a portion of the lines Bonneville acquires from the West Coast Company upon final approval of plans for the construction of a heavier circuit along the same right of way.

Eugene Decides to Build Own Steam Plant

Developments in the sale of Bonneville power were over-shadowed by the news from Eugene, Ore., that that city has decided to spend $510,000 on a new steam plant to provide standby and peaking service for its municipal system. The plant, which will be started at once, will have a capacity of 7,500 kw.

J. W. McArthur, Superintendent of the Eugene Water Board, explained that costs under this plan would be cheaper than any rate available from Bonneville, since Bonneville power is cheap only when the power so purchased can be used at a high load factor. The way is left open, however, for an inter-tie between the two systems in the future and McArthur explained that this might readily prove mutually advantageous.

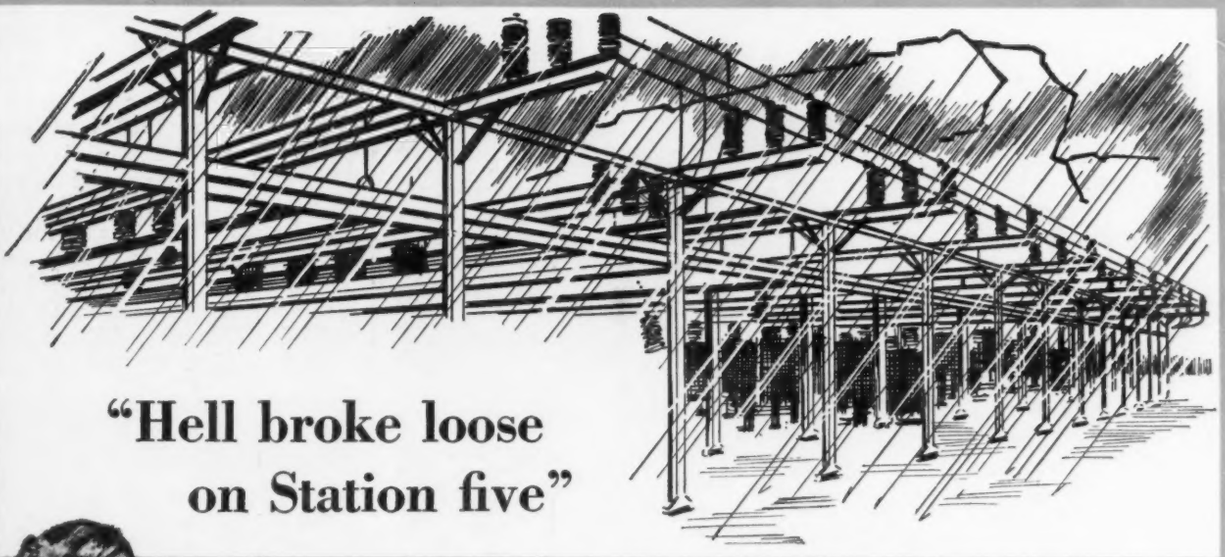
This decision of the Eugene Water Board brings to a close negotiations with Bonneville extending over practically a two year period. In recent months Eugene's and other newspapers have pointed out the coercive tactics employed by the Bonneville Administration in the early stages of the negotiations. "Home rule" of Eugene's municipal system was a major issue during one stage of the negotiations but in recent weeks Dr. Paul J. Raver, Bonneville Administrator, made it plain that Bonneville would not attempt to control re-sale rates at Eugene, since that city had such an excellent record of rate reductions over a period of many years.

● THE PUBLIC SERVICE COMMISSION OF UTAH has granted the Utah Power & Light Co. a certificate of convenience and necessity authorizing it to continue providing electrical service in the city of Provo. Provo has refused to renew a city franchise because the city is constructing a municipal power plant and distributing system. The Utah Power & Light Co. has agreed to sell Provo its distribution system, with the exception of lines transmitting energy beyond the city limits and to the Utah State hospital.

Bean Asks New Electric Rates For Portland Apartment Owners

Ormond R. Bean, state utilities commissioner of Oregon, has asked Portland electric companies to work out a satisfactory low electric rate for apartment houses in the city, and file a report in his office within a week. Apartment house owners claim unjust discrimination against them in favor of the residential consumer.

They told Bean that unless some action was taken there was a possibility that they would refuse to pay their current bills upon the existing basis of rates.



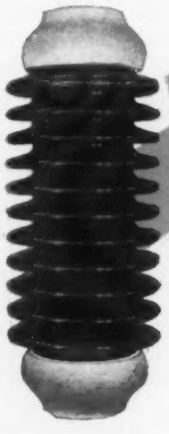
"Hell broke loose on Station five"

"It was a murky, humid July afternoon. I suppose the Coast Guard had storm signals flying, but we were spending the day looking over part of the system, with an eye to running a new 8-mile piece of 33 Kv line.

"We got out to substation five—that's the new one with all switches and busses on Station Posts—when we realized we were in for a real old-fashioned stem-winder of a thunder storm. She blackened up, started to blow and rain and flash lightning like all get out. Well, you never saw a nicer fireworks display than that substation put on for about an hour. Switches banging in and out and power arcovers from hell to breakfast.

"When she cleared off, I got on the phone to check up. We had plenty of damage, all right. Conductors down in four places. Three other substations were all jammed up. Insulators burned and a couple practically pulverized. Took us a couple of days to get cleaned up. But, say, you should see number five. Soon as the sun came out she looked good as new. Worked smooth as silk all through it, and every piece of equipment sound as a dollar. You can't beat those Station Posts when things start popping.

"P.S. We're putting in that 33 Kv line—and it's going on Line Posts!"



There's sound engineering behind Station Post performance. A down-to-facts discussion appears on pages 62-65 of the new Lapp catalog. If you haven't a copy, write for one today.

LAPP INSULATORS

LAPP INSULATOR CO., INC.....LEROY, N. Y., U. S. A.

"All Fans are alike!"

.... SAID HE

(A General Electric Distributor Salesman Talks to a Dealer)

"All Fans are alike," said he. "Zattso?" said I. "Yes," said he, "All fans are the same, and that's that!" "No that's not that! You need fans to supply the demand. Right?" "Right." "Well, you want to sell the best fan. Right?" "Yep." "Then," said I "get a load of this —"

"That G-E motor is as rugged as they make 'em. Why shouldn't it be? G-E has made Fans for over 45 years and these motors keep going, year after year."

"Well-l-l."

"And look at those G-E blades—the result of years of research. G-E was first to develop new quiet blades to improve performance. If they weren't good why would others follow? Sure, you know the answer as well as I do; they are good!"

"Go ahead. I'm learning."

WATCH FOR THE APRIL TRADE ADS. NEWEST G-E UP-TO-THE-MINUTE STYLING WILL BE ANNOUNCED

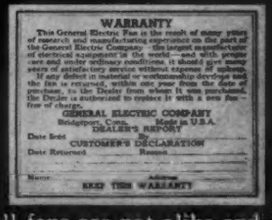
"Another thing. Don't forget appearance—styling is important. G-E fans have quality and performance *plus* modern 1940 styling."

"That's something to think about."

"Yes, and so is this. D'you know that G-E makes the most complete line of Fans in the industry today? Figure it out for yourself—you sell only when you can fill the need. When you sell G-E you've got a Fan for every purpose."

"Good point there."

"Roll 'em all together and add the G-E warranty—no strings—no jokers. So seldom does a G-E Fan give trouble that you can forget about it most of the time. But when you need the manufacturer's 100% backing, you need it quick. G-E gives it to you. And the exact-same warranty is back of every Fan in the G-E line."



WARRANTY

This General Electric Fan is the result of many years of research and manufacturing experience on the part of the General Electric Company — the largest manufacturer of electrical equipment in the world — and with proper care and under ordinary conditions, it should give many years of satisfactory service without expense of repairs.

If any defect in material or workmanship develops and the fan is returned, within one year from the date of purchase, to the Dealer from whom it was purchased, the Dealer is authorized to replace it with a new fan — free of charge.

GENERAL ELECTRIC COMPANY
Bridgeport, Conn. Made in U.S.A.

DEALER'S REPORT

Date Sold ..... By .....

CUSTOMER'S DECLARATION

Date Returned ..... Reason .....

Name ..... Address .....

KEEP THIS WARRANTY

"Now you're talking, Mister. I guess all fans are not alike and I'm sure glad to have the story. I figure I can do a job on this line."

"You bet you can! I've only hit the high spots. Read this catalog carefully. You'll find many additional reasons why G-E delivers more customers to dealers than any other electrical manufacturer."

GENERAL ELECTRIC Fans

Fan Sales Section, Appliance and Merchandise Dept., General Electric Company, Bridgeport, Connecticut

General Electric Signs For Large Exhibit Space at Fair

General Electric last month signed for the largest block of exhibit space so far allotted for the 1940 version of the Golden Gate Exposition. According to Allen G. Jones, who signed the contract, representing Raymond M. Alvord, vice-president, G-E's 1940 exhibit will mean an investment of $250,000, and will occupy an entire corner of the Palace of Electricity. Popular scientific displays and a 1940 remodelled House of Magic will be included.

Allen G. Jones (left) manager, central station transportation dept. of G-E, watches Marshall Dill, president, Golden Gate Exposition, complete arrangements for General Electric space

At the same time, Exposition officials awarded G-E a contract for exterior illumination. Surveys have shown that illumination was the number one feature of the 1939 Fair. A. F. Dickerson, G-E engineer, who handled last year's spectacular $1,500,000 lighting job, will arrive shortly from Schenectady to confer with Fair officials on lighting improvements for the 1940 show on Treasure Island.

Ten PUD Elections Set For May in Oregon

Ten separate PUD elections in Oregon are expected to be held on the date of the state primary election May 17, according to Charles E. Stricklin, state engineer, and secretary of the Hydro-Electric Commission. These include six proposed districts that are practically county-wide, one embracing the corporate limits of the city of Portland and three small fragments.

The large county districts are Washington, Clackamas, Lincoln, Benton, Coos and Yamhill. In each of these, as well as in the district comprising the city of Portland, the report of the Hydro-Electric Commission, which is one of the preliminaries required by law, has been or will be issued in time for district promoters to complete ar-

Hotpoint

VALUE SCOOP!

THE CENTURY
A full-size Automatic Electric Range with Hotpoint quality features at a new low price!

OPENS A BROAD, NEW MARKET WITH THIS FULL-SIZE FAMILY RANGE . . . *THE BUY OF THE CENTURY—MADE TO RETAIL AT*

$99.50

IN MOST LOCALITIES

FEATURES WITH SOLID SALES PUNCH!

- **MEASURED HEAT—year's greatest feature in electric ranges.**
- **All porcelain enamel.**
- **Three Select-a-Heat Calrod units with 5 measured heats.**
- **One-piece top of Stain-Resistant enamel.**
- **Oversize 6-qt. Thrift Cooker—steams, stews, boils. Cooks complete meals.**
- **Fully automatic, All-Purpose oven with two fast-heating units.**

Lamp and Timer available at slight additional cost.

EDISON GENERAL ELECTRIC APPLIANCE COMPANY, Inc., 5612 West Taylor Street, Chicago, Illinois

Hotpoint ELECTRIC RANGES

REFRIGERATORS • WATER HEATERS • WASHERS AND IRONERS • CLOTHES DRYER • DISHWASHER-SINKS

rangements to have the district go on the ballot May 17.

The three fragmentary districts are: Nehalem Valley comprising a portion of Clatsop and Columbia counties, about 68 sq. mi.; the Sand Lake annexation to the existing Tillamook District, about 20 sq. mi.; and an 84-sq. mi. area in the vicinity of Clatskanie in Columbia county.

Proposed districts in Union and Marion counties will probably not be reported on in time to make the primary election. It is possible that these proposals will be voted on at the November election.

Southern California Edison Declares Rate Reduction

An electric rate reduction which will amount to an annual customer savings of $1,000,000 has been declared by the Southern California Edison Co., following extended investigations of the company's operations by the State Railroad Commission.

According to Ray L. Riley, president of the commission, the reduction will affect street lighting, domestic and commercial customers in approximately 200 municipalities in Los Angeles, Ventura, Santa Barbara, San Bernardino, Kings, Tulare, Kern and Orange Counties.

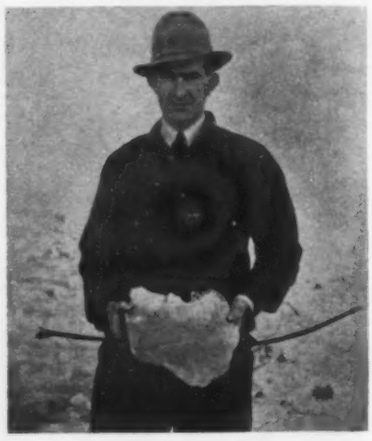
Freak Ice Storm Licked By Alert P P & L Emergency Crew

From the top of a pole, a flashlight could not be seen through the freezing fog that laid an estimated 40-ton ice sheet on seven spans of 66-kv. line in Oregon last month, snapping the line twice and giving emergency crews a 19-hour battle. Despite this freak of nature, consumers' lights at Hood River, only a short distance away, showed only a flicker as this havoc on nearby Indian Mountain tended to completely disrupt electric service.

At the height of the storm, ice-sheathed lines measured 21 in. in circumference. To reach the first break, lines crews had to cut steps in the ice up a steep three-quarter mile slope. Hardly was the first break repaired, when another section snapped. One pole broke in three parts and another was torn bodily from the ground.

A tractor borrowed from a nearby farmer succeeded in getting one new pole to the scene, but the other had to be inched up the mountain side by hand. All available man power, including radio and service men, were put on the job, which was made extremely hazardous by the continual falling of big trees under the heavy ice.

To Charles Druse, line supt. at Hood River, and the 24 men who worked with him, real credit for carrying



Harold Bryant, extension salesman, Pacific Power & Light Co., was a member of the crew who fought the 40-ton ice sheet on Oregon lines

through one of the toughest assignments of the year, in upholding the utility tradition of maintaining service.

Public Ownership Group Meet at Grand Coulee

At an organization meeting of the Washington Public Ownership League in Grand Coulee, Wash., 85 public power boosters made a scathing attack on Initiative 139, which requires that the vote at PUD elections involving financial obligations be at least 50% of that cast at the last preceding general election. The League adopted unanimously a resolution opposing the measure, on which signatures are now being obtained.

On March 16, a meeting will be held in Yakima to perfect the state organization, which has as temporary officers, Harry Pierson, president; James O'Sullivan, secretary.

Dr. Carl D. Thompson, expert consultant for Bonneville, and Jack Cluck, attorney for ten PUD districts, spoke at the meeting.

City of Grand Coulee Buys Power Plant for $40,000

City council of Grand Coulee, (Wash.) has voted to purchase the properties of the Three Engineers Co., Inc., at a cost of $40,000 and buy power from Grand Coulee, which will be available in September. J. W. Jarvis, power superintendent of Cashmere, who recently completed a survey of the system, estimated the cost as it now stands at $37,000.

O. R. Rable, president of the company, states the concern was earning $3,000 to $4,000 a month. City officials expect that when the cheap power from Grand Coulee is available, a drastic reduction in rates will be possible.

Save 25% to 50% on TIME!

TELESCOPE BM SYSTEM

B-M Connectors and Couplings put SPEED into that conduit or tubing job—*and you pocket the savings!* Just two squeezes with the patented B-M indenter make a SECURE joint or coupling. It's the SIMPLE METHOD for quick, *quality* work.

ALSO:
- Save 25% on material.
- Eliminate complications.
- Quick, easy installations.
- Stronger, neater connections.
- No fussing with nuts to tighten.

For More Profit on Every Job!

$1.35 Buys the One Tool Needed

This one patented tool (½" B.M. Indenter) handles 80% of all installations. Pays for itself many times over on the very first job.

Approved by Underwriter's Laboratories

Distributed By:

The M. B. Austin Co., Chicago, Ill.
Clayton Mark & Co., Evanston, Ill.
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The Steelduct Co., Youngstown, Ohio
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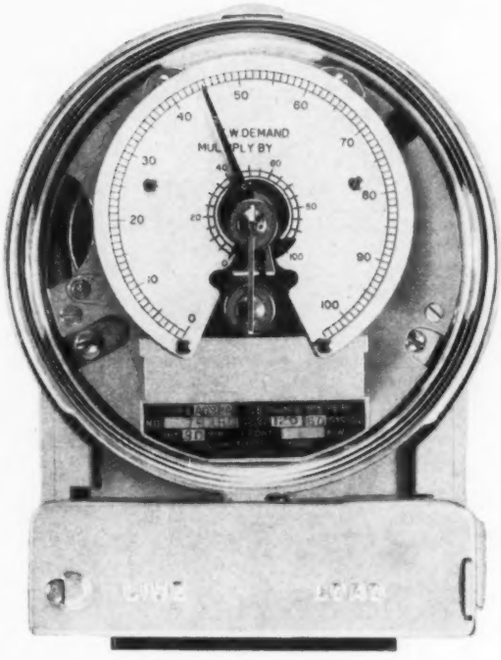
National Enameling & Mfg. Co. Pittsburgh, Pa.
Triangle Conduit & Cable Co., Elmhurst, New York City

BRIEGEL METHOD TOOL CO., Galva, Illinois

MAXIMUM DEMAND MEASUREMENT

FOR SINGLE OR MULTIPLE (2, 3, or 4) OPERATION



FOR DIRECT OR ALTERNATING CURRENT

WITH SANGAMO TYPE AG DEMAND METERS

THE Sangamo Type AG Demand Meter is an auxiliary device for indicating the maximum demand for one or more equal time intervals. Available in either direct or alternating current construction and operating from contacts in the watthour meter, the maximum demand from a single watthour meter can be measured or the maximum demand from two, three or four watthour meters can be totalized. Accurate and dependable, these demand meters offer a simple solution to many perplexing demand problems.

SANGAMO ELECTRIC COMPANY SPRINGFIELD ILLINOIS

Contracts Awarded

To Clifford Electrical Co., Oakland, for electrical work on "Campbell Village," a low-rent housing project in Oakland, Calif., $16,700.

To Hume and Rumble, Ltd., Vancouver, the sub-contract for the wiring of the new laboratory of the Powell River Co. pulp and paper plant. The Canadian General Electric Co., Ltd., will supply the humidifying equipment for this building.

To Ne-Page Electric Co., Seattle, for rehabilitation of the electrical drawspan for the Ballard bridge across the Lake Washington canal, by the Seattle Board of Public Works, $9,369.

To General Electric Co., Schenectady, for the installation of switchboard equipment on the Wapato power project on the Yakima, Wash., Indian reservation, $17,987.

To American Electric Construction Co., San Francisco, for complete electric lighting and power system in new machine shops, Mare Island, Calif., Navy Yard, $34,508.

To R. H. Walker, Los Angeles, for installation of an ornamental lighting system on Olympic Blvd., Los Angeles, $58,685.

To Westinghouse Electric & Mfg. Co., Denver, for three 30,000 kva. generators for Parker Dam power plant, near Phoenix, Ariz., $1,088,330.

To Jagger-Scroufe, Portland, for electrical work on United Airlines hangar, Portland-Columbia super-airport, $15,372.

To Aluminum Co. of America, Pittsburgh, for a conductor and accessories for Yakima-Ellenburg (Wash.) transmission line on Bonneville project, $65,042.

To Newport Construction Co., Portland, Ore., for construction of the entire power system, 190 mi. of line, for the Benton-Lincoln Cooperative, Corvallis, Ore., $170,725.

To Bauman Electric Co., El Paso, for building 169 mi. of line for the Kaufman County Electric Cooperative, Inc., Kaufman, Texas, $83,160.

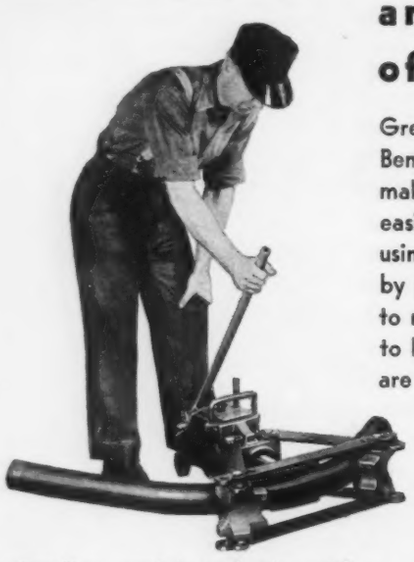
REA Activities

Plumas-Sierra Rural Electric Cooperative, Inc., Portola, Calif., has been awarded $20,000 to complete its system. It has previously been allotted $308,000 to build 223 mi. of line in Plumas and Lassen Counties.

Intermountain Rural Electric Assn., Bailey, Colo., has been awarded $12,000 to complete its system, which previously had been allotted $109,000 to build 92 mi. of line in Jefferson and Park Counties, and $5,000 to finance house wiring.

Northern Idaho Rural Electrical Rehabilitation Assn., Inc., Sandpoint, Idaho, has been allotted $75,000 to build about 55 mi. of line in Bonner and Boundary Counties.

SAVE Time and Money and do a Better Job of Bending Conduit



Greenlee Hydraulic Conduit and Pipe Benders not only save time, but they make smooth, even bends, making it easier to pull in wire and cable. By using hydraulic pressure, which is set up by pumping the handle, it was possible to make these tools very compact, easy to handle, and simple to operate. They are built in two sizes for conduit from 1¼ to 3-inch and from 3 to 4½ inch.

Bending conduit and pipe with a Greenlee Hydraulic Bender is as easy as the above photo indicates. It is readily portable and simple to set up and operate.

Let Us Tell You All About These Tools

Complete information on Benders will be sent gladly. And if you don't have a copy of our catalog showing many other tools for electrical construction, ask for one now.

GREENLEE TOOL CO., 1703 Columbia Ave., ROCKFORD, ILL.

TRADE NOTES

Maydwell & Hartzell Named Pacific Tank Representatives

Pacific Tank & Pipe Co., Oakland, has appointed Maydwell & Hartzell, Inc. as its sales representatives for the Pacific Coast area, handling its line of cross-arms and wood mouldings. The Pacific Tank & Pipe Co. has been in continuous operation since 1888 and National Mill & Lumber Co., an associate company, has been manufacturing cross-arms and wood mouldings since 1907. The name "National Mill & Lumber Co." has been discontinued and the operation is now conducted as one of the departments of the Pacific Tank & Pipe Co. continuing under the same operating personnel, which has been in charge for the past 15 years.

● H. E. Saviers & Sons, Inc., electrical appliance dealers, Reno, are planning to move into a new $100,000 two-story home by April 1. Built of reinforced concrete and steel, and finished in decorative stucco, the building was constructed by Flyge & Hansen. A tower in the structure may be used later to house radio laboratories.

● Northwestern Electric Co., Portland was among the winners of a recent Modern Kitchen Bureau electric water heater display contest. J. W. Bremmer, display manager for the company, planned the prize-winning window.

● Z. C. M. I. Wholesale Appliance, Salt Lake City, and E. M. Roberts, Jr., Phoenix, have been named as new distributors for Stewart-Warner Appliances, according to Charles R. D'Olive, manager of the appliance division.

● Railway & Industrial Engineering Co. has enlarged the territory covered by its direct representative, Charles Croft, in Los Angeles. Croft will now also cover northern California and southern Oregon. Northern Oregon and Washington will be handled by E. A. Olsen, a manufacturers' agent located in Seattle.

● C. J. Gratiot & Sons, manufacturers' agent handling Eagle Electric Co., Gaynor Electric lines and others in San Francisco, have moved from 351 9th street to new and more spacious quarters at 1282 Folson street.

● The Electric Steel Foundry Co., Honolulu, has been appointed sales agent in the Territory of Hawaii for The Roller-Smith Co.

It's Amazing...

HOW THIS NEW DELTABESTON RESISTOR CABLE CAN "Rub Elbows" WITH HOT RESISTORS

Yes—"rub elbows" with hot resistors and laugh at the heat—that's the job for which this G-E Deltabeston Resistor Cable was designed. That specifically.

It's amazing, all right—until you understand the reasons. Take, for example, the Flamenol tape wrap over that tinned copper conductor. Flamenol is a "bear for punishment" when it comes to protection from heat.

Look at the next wrap—purified Asbestos (by the exclusive Deltabeston Purification Process) felted around the tape and then impregnated with a flame-, heat-, and moisture-resisting compound.

Over this a closely woven purified asbestos braid with a heat- and moisture-resisting finish—a finish carefully applied and then wiped to give a smooth, uniform exterior coating.

IT'S NOT AMAZING, THEN—NOT IF YOU UNDERSTAND HOW DELTABESTON RESISTOR CABLE IS MADE. And don't forget that it laughs at moisture the same way it laughs at heat. YOU NEED IT ON YOUR CONTROL BOARDS.

Use the coupon to get a sample and catalog information on this New G-E Deltabeston Resistor Cable. We'll take care of you in a hurry.

Deltabeston Wires and Cables are distributed by all G-E Merchandise Distributors and by Graybar Electric Co.

Section Y-0233, Appliance & Merchandise Department, General Electric Company, Bridgeport, Conn.

Send me a sample and catalog on the New Deltabeston Resistor Cable.

Name.....

Address.....

City..... State.....

GENERAL ELECTRIC

NEVER SEEN BEFORE

Two years painstaking investigation makes available for the first time a map showing electric generating and transmitting facilities in the West, complete to January 1, 1940.

THE MAP SHOWS

Type, capacity of plants
Voltage, capacity of lines
Type, size of conductors
Receiving station capacities
Interconnection capacities

Scale: 1 in. = 20 mi.
Size: 48 x 68 in. (approx.)
Prepared by Frank I. Towle Jr.

THE MAP COVERS

Arizona	Nevada
California	Oregon
Idaho	Utah
Montana	Washington

and parts of British Columbia and Wyoming, and enlargements of sub-transmission facilities in nine city areas.

Those who need facts at a glance — all those concerned with planning, building, regulating, selling to or studying electric systems in the West will find this map invaluable. It is offered as a time saver for busy individuals and organizations. Write for details.

McGraw-Hill Co. of Calif.
68 Post St., San Francisco

● GARDNER ELECTRIC MFG. CO., Emeryville (Oakland), Calif., has appointed Maydwell & Hartzell Inc. as exclusive sales representative for the Pacific Coast area on its line of distribution and power transformers. The Gardner Electric Mfg. Co. has been manufacturing transformers on the Pacific Coast for 31 years. The Maydwell & Hartzell organization has specialized in the sale of transmission and distribution equipment on the Coast since 1923, and has offices in San Francisco, Los Angeles and Portland.

● ALBERT PENN, president of the Penn Electric Switch Co., Goshen, Ind., saw agents on the Pacific Coast during February. While in San Francisco, he visited the Garland-Affolter Engineering Corp.

● THE FRANKLIN ELECTRIC CO., Seattle, has moved to larger quarters at Second Avenue and Union Street, where they will establish the "Electrical Center."

● CIRCU-LECTRIC, INC., 748 Market Street, Tacoma, has been incorporated for $20,000, to operate and carry on a mercantile and manufacturing business, to deal in electrical heating appliances. Incorporators are Alf Soloos, Porter D. Norton and Homer F. King.

● GEORGE HAMBURGER has been appointed manufacturers' agent for Sheldon Service Corp. in Denver. William Cottrell has also been named a Sheldon agent, with headquarters in Seattle.

● ALFRED LEMMON and Harold Travers have established a business in Reno specializing in the servicing and re-conditioning of appliances. Among other things they will be handling appliance servicing for the Sierra Pacific Power Co. Lemmon, who is the son of H. A. Lemmon, vice-president of Sierra Pacific, was for 14 years connected with the Blackstone Valley Gas & Electric Co. of Pawtucket, R. I. He was at various times safety engineer, advertising manager, supervisor of district representatives and finally assistant to the general sales manager. Travers was for 14 years manager of the SPP service and repair department.

● APPLIANCE WHOLESALERS OF WASHINGTON. a new distributing firm, opened headquarters at 429 Boren Avenue North in Seattle recently. The concern is headed by Frank H. Barstow, president, and will include the former Frank H. Barstow Co. which has been connected with appliance merchandising in Portland and Seattle for the past 20 years.

● LEE RALEY of Dallas,Texas, will represent the McGill Mfg. Co. Valparaiso, Ind. in Colorado, Utah, New Mexico and Wyoming effective April 1, 1940. Raley will represent the McGill line of Levolier switches, lamp guards and electrical accessories in this new territory, which is in addition to the company's regular Southwest territory that he has covered for some time.

● FRED W. BEECHER, lone manager for General Motor Sales Corp., was principal speaker at a recent meeting of 220 Frigidaire dealers and salesmen from Salt Lake City and adjoining territory. Charles C. Bintz, president of the W. H. Bintz Co., Intermountain distributors for Frigidaire, conducted the meetings.

● ERNEST L. DEE, Salt Lake City manager for the Incandescent Lamp Dept., General Electric, demonstrated new lighting methods and lamps before the Salt Lake Building Owners and Managers' Assn. Feb. 12.

● W. A. QUINLAN, president, Robins & Meyers, electric motor manufacturers, Springfield, Ohio, recently visited Pacific Coast headquarters in San Francisco, where C. R. Hunt is manufacturers' agent for the line.

● J. F. FENWICK, Hawaiian Electric Co., Honolulu, has retired and will be succeeded by Paul H. Anderson.

● THE NATIONAL NOMINATING COMMITTEE of AIEE has nominated for the presidency, R. W. Sorenson, professor of electrical engineering and head of the Dept. of Engineering, California Inst. of Technology, Pasadena. For vice-president of the North West District, A. Leroy Taylor, Dean, School of Mines and Engineering, Univ. of Utah, Salt Lake City, was selected.

● H. C. DARROCH, appliance sales manager, Canadian Westinghouse Company, Vancouver, has been elected as chairman of the Home Appliance Council of the Electrical Service League of British Columbia, succeeding Norman Gardiner, who is merchandising manager, Canadian Westinghouse Co., Vancouver.

D. Brooks, merchandise manager, Northern Electric Co., Vancouver, has been elected as vice-chairman of the Council. Other elected members are: R. Hall, secretary-manager, Electrical Service League of B.C.; J. H. Taylor, chief clerk, merchandising department, B.C. Electric Railway Co.; Harold Merilees, promotional manager, B. C. Electric Railway Co.; and E. Cooper, appliance promotion manager of McLennan Mcfeely & Prior Ltd.

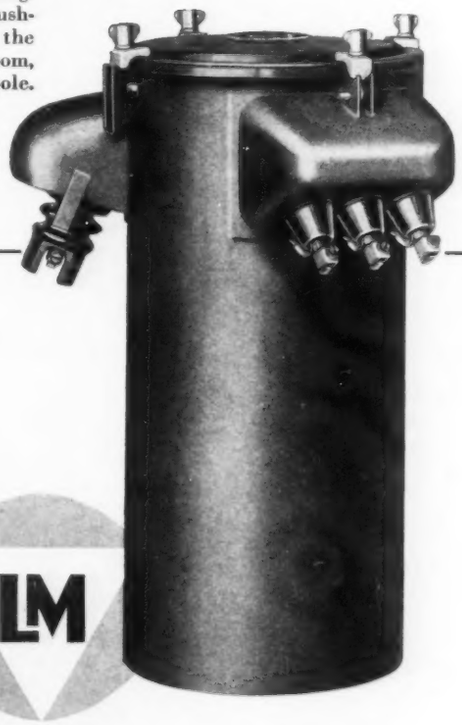
"Bushing Breakage *Used to be* a lot of trouble"

Finally the boss cracked down. Said we were breaking so many transformer bushings in the store room it looked like sabotage. I didn't blame him for his peeve, even though we hadn't been careless.

Next I showed him that the secondary bushings on L-M Transformers are protected by the same type of overhanging pocket. I knew we had the bushing problem licked when the boss said we'd see a lot more L-M Transformers coming in from now on.

I showed the boss just how that overhanging pocket they put on the primary bushings of L-M Transformers protects the bushings from bumps in the store room, on the truck, and going up the pole.

the boss gave us a fancy going over I ed out to him that we didn't have broken bushing trouble with L-M formers. He got interested right away.



Those overhanging pockets on L-M Transformers do a great deal more than make the bushings safe from bumps. They are one of the big reasons why rain, snow and sleet don't get inside L-M Transformer tanks. As a matter of fact, these L-M overhanging pockets prevent rain and snow from even getting near the gaskets, where moisture seepage is most likely to occur. Important, too, are the greater clearances inside L-M tanks made possible by recessing the bushings in the overhanging pockets. And, if repairs should ever become necessary, you can lift the L-M core and coil assembly right out of the tank without removing the bushings . . . recessed in the overhanging pockets, L-M bushings are never in the way.

LM

LINE MATERIAL CO.

Griffith Succeeded by Polhemus at Portland GE

On his 70th birthday on Feb. 6, Franklin T. Griffith, for many years president of Portland Electric Power Co., Portland General Electric Co. and Portland Traction Co., tendered his resignation as president of Portland General Electric, to the board of directors who accepted this resignation, made Griffith chairman of the board, and elected James H. Polhemus, executive vice-president of the company, to succeed to the presidency on Mar. 1.

Franklin T. Griffith, born in the Middle West in 1870, came to Oregon City in 1894, and was admitted to the bar. In the 15 years he practiced law there, part of the time as city attorney, he became division counsel for Portland Railway, Light & Power Co., the predecessor of Portland Electric Power Co.

GRIFFITH

In 1909 he came to Portland as general counsel for the company and formed the law firm of Griffith, Leiter & Allen. In 1913 he was made president, a position he has held ever since.

James H. Polhemus, who succeeds Mr. Griffith as president of Portland General Electric Co., is a native Oregonian having been born in Newport in 1887. He received his B.A. in civil engineering at Stanford in 1911 and began his engineering career as field engineer and superintendent of construction for the U. S. engineers on The Dalles-Celilo canal where he remained until 1914. In 1914 the U. S. engineers sent him to Coos Bay, Ore., to take charge of dredging and harbor improvements and he stayed on this job until 1918 when he became manager of the Coos Bay Shipbuilding Co. In 1920 he came to Portland to become chief engineer and general manager of the Port of Portland, a position he held until 1936 when he was brought into the Portland General Electric Co. as executive vice-president, a newly created position at that time.

POLHEMUS

Euler Named New Chief Engineer at PG and E

W. G. B. Euler has been named chief engineer of the Pacific Gas and Electric Co., according to Paul M. Downing, general manager. Euler, who has been general supt. of the PG and E San Francisco and East Bay divisions, succeeds the late Arthur H. Markwart, who held the position of vice-president in charge of engineering.

He is a native of San Francisco and a graduate of Univ. of California, and a veteran in utility work, having joined the engineering staff of the Great Western Power Co. in 1910. At the time, PG and E merged with that company, he was general supt. in charge of operations.

★ *For Quick Service on Quality Products from Local Stocks*

Get in Touch with: **GEO. E. HONN CO.**

420 MARKET ST. SAN FRANCISCO, CAL.

MANUFACTURER'S REPRESENTATIVE FOR:

PYREX INSULATORS, POWER AND RADIO
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FUSES, RESISTORS, MOUNTINGS, CUTOUTS, FUSE LINKS, DISCONNECTS, BUS SUPPORTS
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GUY WIRE PROTECTORS, CONE ANCHORS, EARTH AUGERS
The Specialty Device Co.

GROUND LINE POLE AND GREEN WOOD TREATMENT
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TONG TEST AMMETERS—LOW VOLTAGE GENERATORS
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UNDERGROUND CABLE TOOLS & EQUIPMENT
T. J. Cope, Inc.

TREE TRIMMING EQUIPMENT
TREE SURGEONS' TOOLS
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For the Coast Trade

At your doorstep you now have an adequate stock of popular D-H alloys, wires, ribbons, rods and other forms.

Driver-Harris Company
Harrison, N. J.

TRADE MARK REG. U.S. PAT. OFF.
Nichrome

Every house needs Westinghouse

NATIONALLY KNOWN...AND

MADE IN THE WEST

FOR *Easier* WEST COAST SELLING!

Westinghouse *Electric* Water Heaters

Emeryville, California plant where Westinghouse Water Heaters are made by West Coast people for quick, low cost delivery to dealers west of the Rockies.

...AND HERE'S A PLAN OF ACTION WITH

a New Selling Slant!

It's a new strategy that licks tough sales-killers like: "My old heater gives me hot water; besides, electricity costs too much." Dramatically it puts across two facts few prospects realize:

1. They need water at least 140° HOT.
2. Right now, they've got ALMOST what it takes for real 140° HOT water service. They've got running water; an investment in plumbing and fixtures equal to about 10% of the cost of their homes; and (how few realize *this*) a *special low rate* that makes electric water heating cost less than ever!

When prospects see for how *little more* they can make their present big investment pay dividends in real 140° HOT water service—plus extra convenience, safety and savings—water heater sales go UP!

It's a powerful new selling idea built into a practical plan. Get your free copy from your distributor, or write the Westinghouse Electric & Manufacturing Co., Merchandising Division, Mansfield, Ohio, Department 12.

YOU'VE GOT almost WHAT IT TAKES
A NEW SELLING PLAN TO HELP YOU
Win Extra Profits
WITH WESTINGHOUSE Electric WATER HEATERS

Get your free Plan book now!

TUNE IN "MUSICAL AMERICANA"
N.B.C. Blue Network, Thursdays,
9:30 P.M. M.S.T., 8:30 P.M. P.S.T.

Westinghouse *Home-proved* **Water Heaters**

"The Line of Least Resistance"

Euler will be assisted in his new position by Oliver R. Evans, division supt. of PG and E in the Stockton division. "Bob" Evans is a PG and E veteran, joining the company in 1909 as a member of a line crew in Santa Rosa. Upon his return to California after the World War, he joined the PG and E valuation department, and within a few months was transferred to Stockton. There he rose through the ranks to become Stockton division supt.

Succeeding Evans at Stockton is George A. Peers, who held the Coast Valleys superintendent's job at Salinas since 1930. For ten years prior to that. Peers had been assistant supt., employed first by the Coast Valleys Gas & Electric Co., predecessor of PG and E in the Salinas region.

William T. Hannum has been named successor to Peers at Salinas. He comes from the PG and E general office at San Francisco, where he was assistant engineer in line construction. Hannum has been with the utility company since 1920.

EULER

James S. Moulton, assistant to the vice-president and assistant general manager of PG and E, has been promoted to a position in the statistical and rate department under W. G. Vincent, executive engineer. Moulton will make system studies and handle regulatory, rate and valuation matters.

He was graduated from Yale in 1930, joining the San Joaquin Light & Power Corp. in 1921. Later he became executive engineer of Great Western Power, and in 1930 he took over the position he is now vacating.

A. D. Church, an executive assistant in the San Joaquin Power Division of the company, has been named to succeed him. Church, whose new headquarters will be San Francisco, joined the company as clerk at Baker steam plant in 1914. His other experience has been in sales and public relations.

Crane Wins Southern California Edison Lighting Award

H. T. Crane, Southern California Edison Co. illuminating engineer in the company's Santa Monica division, is the winner of the W. L. Frost award for the best performance by a commercial lighting engineer during 1939, according to C. E. Houston, assistant general manager of the company.

The award, named in honor of W. L. Frost, retired Edison vice-president, is made annually to the lighting engineer on the Edison staff throughout southern and central California who has the most outstanding record for the previous year. It consists of a trip, with all expenses paid, to the advanced conference of utility lighting representatives held each spring at Nela Park.

Crane will be joined in the trip by the 1938 winner, D. H. Miller, Jr., illuminating engineer in the company's Huntington Park division. Both men are members of the Southern California section IES and have been in lighting work with Edison for about seven years.

Jones Appointed New President Of Cities Service, New York

W. Alton Jones has been named new president of the Cities Service Co. New York. Formerly vice-president and a director of the Public Service Co. of Colorado, Jones succeeds the late Henry L. Doherty. He has served in important positions in organizations such as the National Electric Light Assn., of which he was the first vice-president in

JONES

1929 and president from 1930 to 1931. For six years he was with the Empire District Electric Co. from accountant to acting secretary, and was at one time cashier of the Webb City and Carterville Gas Co., in Missouri.

● J. C. Gaylord was appointed Feb. 1 as new superintendent of Southern California Edison Co. hydro generation, according to R. G. Boyles, manager of operation. Gaylord, who reports in the new position to J. F. Davenport, superintendent of generation, had been hydro engineer for the Edison company for six years, and had been a member of the operating department since 1932. He has been with Edison for 28 years, a number of which were spent in the department of engineering design.

● Dr. Adam S. Bennion, assistant to the president of Utah Power & Light Co. will head the Salt Lake City chapter of the American Red Cross in 1940. Dr. Bennion was also chairman of the organization in 1939.

G.C.A.
Lamp Replacers
Lamp Base Removers
Cartridge Fuse Tongs
Switch Hooks
Send for Catalogue
We have been making safety tools for 24 years
THE G. C. A. Manufacturing Co.
Pittsfield, Mass.

ELECTRICAL TESTING LABORATORIES
Electrical Photometrical, Chemical and Mechanical Tests. Inspection of Materials and Apparatus at Manufactory.
2 East End Ave. New York

TORK CLOCKS

NEW ELECTRICALLY DRIVEN 1940 MODELS NOW AVAILABLE
WITH PLAIN OR ASTRONOMIC DIALS
Whenever it is desired to turn Current on and off Regularly there is a new model Tork Clock that can do it.
THE TORK CLOCK CO., Inc.
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H. M. Sayers, 1019 Eastlake Ave., Seattle
Stevens Sales Co., 41 P. O. Place, Salt Lake City

FLUORESCENT "COMES EASY"

TO CONTRACTORS WHO KNOW THEIR

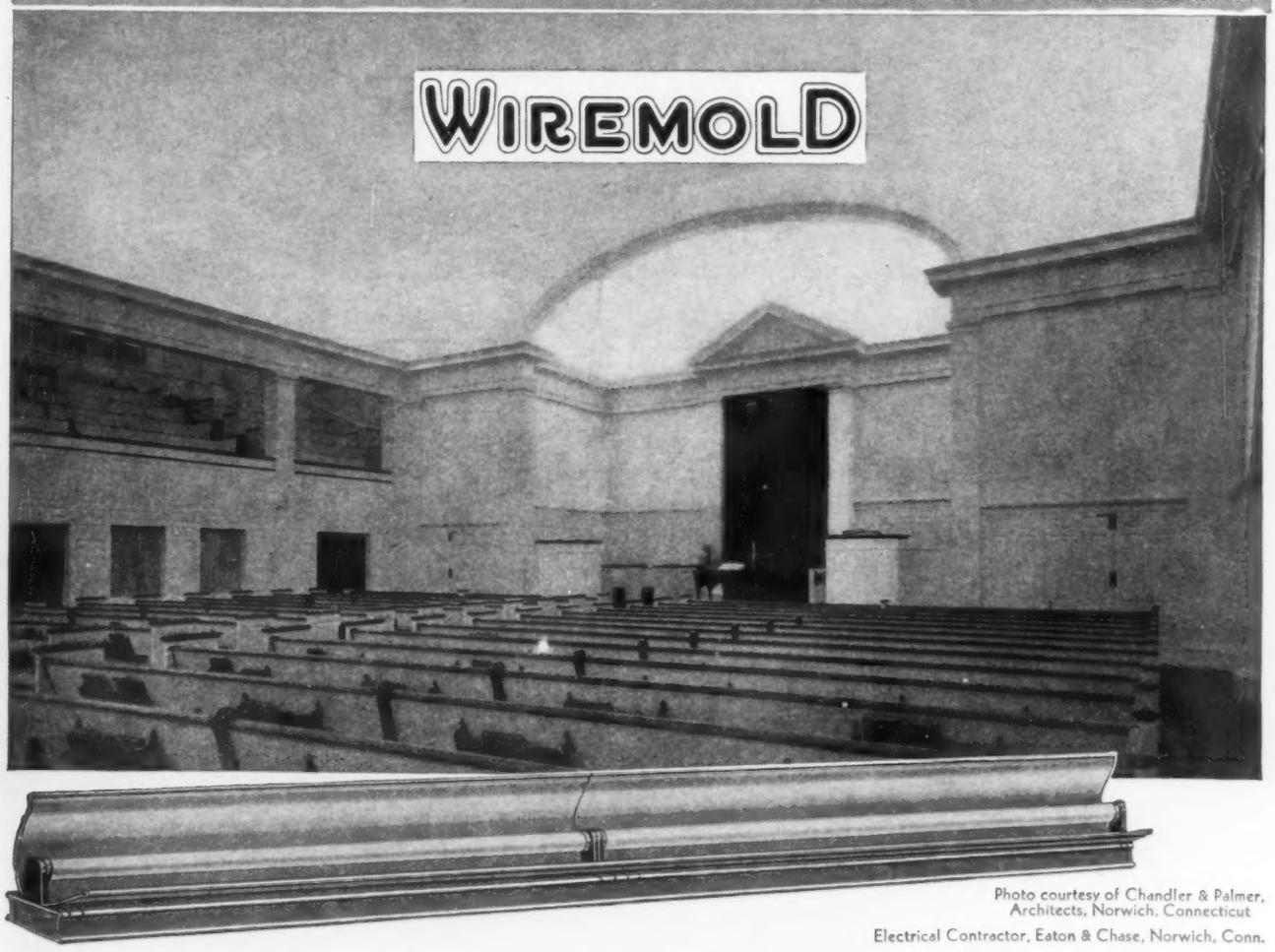

Photo courtesy of Chandler & Palmer, Architects, Norwich, Connecticut
Electrical Contractor, Eaton & Chase, Norwich, Conn.

From the unretouched photograph reproduced above you can see what a beautiful job this contractor did with Wiremold Fluorescent Cove Lighting in a Norwich, Connecticut, church.

See how evenly the light is distributed over the ceiling surfaces. Notice, too, the even intensity of light throughout the entire body of the church. What cannot be shown or adequately described is the unique *quality* of the fluorescent lighting which has demonstrated definite advantages for church illumination.

Jobs like this are typical of the worthwhile fluorescent lighting opportunities that contractors in every territory are handling more easily, more profitably and with greater satisfaction through the use of simple, flexible, correctly engineered Wiremold Fluorescent Lighting Equipment.

No. 3000
WIREMOLD
Fleur-o-lier
FLUORESCENT LIGHTING EQUIPMENT

Use Wiremold FLEUR-O-LIER Fluorescent Lighting Equipment for CONTINUOUS STRIP or MULTIPLE STRIP Lighting, SINGLE or MULTIPLE Units, SHOW CASE and WALL CASE, COVE and special installations.

DON'T FORGET . . . WIREMOLD ENGINEERING SERVICE is always available to help you with your "tough" problems . . . to help you make sure that every Fluorescent job you install is a source of customer satisfaction.

Your Business Builder

THE WIREMOLD COMPANY, HARTFORD, CONNECTICUT

ADEQUATE WIRING SERVES AND SAVES

WIREMOLD

LIGHTING and WIRING EQUIPMENT
LISTED BY UNDERWRITERS' LABORATORIES, INC.

Unusual Test

On Eastern Utility System Proves Value of Capacitors

Power Company Gained 3300 kva of Needed System Capacity for Only $12.85 per kva

HOW THE TEST WAS MADE

To find exactly what effect was obtained from 5520 kva of G-E Pyranol capacitors installed to relieve its system of reactive kva, a large Eastern utility recently made a system-wide test involving every one of its 51 separate capacitor installations.

Linemen were stationed at each installation, and at a prearranged time all of the capacitors were disconnected from service for a period of 10 minutes. Station and substation attendants took the readings necessary to determine the increase in kva of system load with the capacitors disconnected.

WHAT THEY FOUND

By tabulating the readings, the power company engineers found that system kva loading jumped 3300 kva when the capacitors were taken out of service. In other words, each capacitor kva in service was releasing 0.6 kva of system capacity for revenue production. On the basis of the total installed cost of $7.71 per kva for the capacitors, this meant that the power company obtained needed system capacity at the remarkably low cost of $12.85 per kva.

OTHER ADVANTAGES OF CAPACITORS

In the careful study that preceded this installation, the power company engineers found that other factors besides low cost favored the selection of capacitors. For example, capacitor kva could be installed in small or large blocks at strategic locations to obtain the maximum benefit for the dollar invested. Capacitors could be installed easily and quickly—in this case, only 14 working days were required.

CAPACITORS PROFITABLE FOR YOU?

On your system—probably in a number of locations—lie opportunities for the profitable application of G-E Pyranol capacitors. They help, at low cost, to solve the problem of increasing feeder, substation, and generating capacity, with better regulation and lower losses. It will pay you to investigate this economical, reliable means of gaining capacity. Ask your G-E representative about Pyranol capacitors or write for Bulletin GEA-2746, "Pyranol Capacitors for Central Station Applications." Address General Electric Co., Dept. 6D-201, Schenectady, N. Y.

HOW RELIABILITY IS BUILT INTO PYRANOL CAPACITORS

G-E Pyranol capacitors are carefully checked after each manufacturing operation—for example, the check for capacitance illustrated at the left. This test constitutes a check and double check on the correctness of winding and assembly, and picks out any flaw previously undetected. Thorough testing is a major factor in the operating record of Pyranol capacitors—99.8 per cent perfect.

PYRANOL CAPACITORS
THEIR STABLE CHARACTERISTICS ASSURE LONG LIFE

GENERAL ELECTRIC

360-150

Kerr Resigns as Active Head Of The Montana Power Co.

Frank M. Kerr laid aside the active duties of president of the Montana Powder Co. Jan. 27. Kerr, who will continue as honorary president of the company, has been identified with the electrical industry in Butte for many years. Known as the dean of electrical engineering in Montana, he has served the Montana Power Co. for 50 years.

KERR

Kerr became general manager of the company in 1915. The following year, he was named for the vice-presidency and when the late John D. Ryan passed away, Kerr rose to become Montana Power's president.

BIRD

He will be succeeded by Frank W. Bird, who has been with the company since its organization, and Kerr's assistant for 25 years. For the past ten years, he has served as assistant general manager of the company.

● THE JAMES H. MCGRAW AWARD for electrical men was presented Feb. 7 to Huntington B. Crouse, president of the Crouse-Hinds Co., Syracuse. The committee of judges which awarded medal to Mr. Crouse "in recognition of his contribution to the advancement of the manufacturing branch of the electrical industry" consised of D. G. Phelps, vice-president, Colt's Patent Fire Arms Mfg. Co., George C. Thomas, vice-president, The Thomas & Betts Co., M. Porosky, vice-president, Eagle Signal Corp., L. F. Adams, General Electric Co., and Earl Whitehorne, McGraw-Hill Co.

● D. M. SIMMONS, chief engineer of the General Cable Corp., widely known along the Coast through his frequent trips to this area, has been made a member of the General Cable board of directors.

● HARRY G. KELSY, formerly assistant manager of the Grays Harbor Railway & Light Co., has been named sales manager of the Grays Harbor PUD by Manager Beck.

● MARGURETTE REINHART, a graduate home economist of the Univ. of Idaho, and home representative of Idaho Power Co. at Jerome, has been promoted director of the company's home service department. She succeeds Helen M. Swanson, who was home service director since 1935. Miss Swanson became the bride of general sales manager R. E. Gale the same day she announced her resignation.

● HARRY E. JUNG has been appointed distribution engineer for the Southern California Edison Co., reporting to W. E. Row. Fred B. Doolittle, former distribution engineer, has been assigned to general engineering work with the title of electrical engineer, according to R. G. Boyles, Edison company manager of operation.

● A. B. CARLON has been named Hotpoint representative in the Salt Lake City district, according to Bert Rowley, district manager for Edison General Electric Appliance Co. at Salt Lake City. Carlon has been associated with Hotpoint since 1933 as their representative in the Northwest under J. C. Platt, district manager.

● CURTIS C. MUSGROVE, Pacific Electric Mfg. Corp. representative of the Dallas territory has been appointed representative for the whole state of Texas (with the exception of El Paso) and the states of Oklahoma and Louisiana, according to Ed F. Sixtus, vice-president in charge of sales.

New Puget Sound Power Sales Program Advances Hess

In a widely expanded program of Puget Sound Power & Light Co. dealer-cooperation, a corps of newly and specially trained sales representatives is being made available to electric sales dealers and wiring contractors throughout the company's current distribution area to assist them in industry-wide sales campaigns.

Company sales representatives, in preparation for the new work, were given intensive instruction in a company conducted school and studies of new equipment and appliances in sales and display room of major manufacturers.

HESS

The newly augmented service incidentally brought promotion to a considerable number of the company's sales force. Charles Hess was advanced from merchandise supervisor to supervisor of sales promotion in charge of the new work. William B. Bonnett was moved up from district sales supervisor to Hess' former post.

● HENRY J. GILLE, agricultural and industrial development manager, Puget Sound Power & Light, has been elected president of the Associated Chambers of Commerce of Washington for 1940. For the past five years, he has conducted Puget Sound's popular radio program "The Greater Washington Hour." He is a past chairman of the State Development Committee of the Seattle Chamber of Commerce and is still a member of that committee.

● M. E. LUNDBERG, Manager of the Uintah Power & Light Co. at Roosevelt, Utah, has been awarded the 1939 gold key, presented annually by the Junior Chamber of Commerce to the community's outstanding civic leader.

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PROFILES OF THE MONTH

Elmer A. Trask succeeds E. C. Low as sales agent and manager of San Francisco branch of John A. Roebling's Sons Co., wires and cables

William T. Hughes, of Hughes Bros., Whittier, Calif. contracting firm, talks to the "mike" in front of circuit breakers in his new model home

Harold D. Conklin, Pacific Southwest Hotpoint manager, is newly elected president of Electrical Development League of Southern California

Sam Hazelton, Jr., illuminating engineer, Incandescent Lamp Dept., G-E puts on a show for contractors at northern California meetings

(Left to right) Secretary S. N. Vendall and Chairman Fred Schoss, Ogden Division of the Electrical League of Utah, welcome Edward A. Casey and Austin Dunham, western representative and district manager, respectively, of the Anaconda Wire & Cable Co., and show them type of poster placed in front of new Ogden homes in which Adequate Wiring is being installed.

Preview of coming campaigns by

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

ELECTRIC APPLIANCE SOCIETY OF NORTHERN CALIFORNIA

1940 SPRING REFRIGERATOR CAMPAIGN

This is too early for a detailed announcement, but we can say that an all-industry campaign will be held sometime in April. Whether an inducement will be offered, what the campaign slogan will be, how the advertising will be handled—all these are details which must wait another meeting of the Electric Appliance Society refrigerator committee. But we know for certain that particular attention will be paid the replacement market, and the campaign will be built around the enormously increased value in the 1940 refrigerators. Incidentally, this is the same general theme to be used by the Modern Kitchen Bureau in its national refrigerator campaign which is to break about the same time as ours. If you have any ideas, the Electric Appliance Society will be only too glad to hear about them. The more people taking an interested part in planning the campaign, the more representative—and successful—it will be. Keep in touch with your local P.G.&E. office and be ready to go early in April.

DEALERS: By watching this page from month to month you can keep informed of sales promotional campaigns to be sponsored by the Pacific Gas and Electric Company and the Electric Appliance Society. Detailed information will be supplied, as usual, through the mail. If such information is not received, call our local office or write Electric Appliance Society, 1355 Market St., San Francisco, Calif.

EW 103-340

People living in homes with "one-appliance-at-a-time" wiring aren't likely to buy additional electrical appliances. They haven't enough electrical outlets to use and enjoy the appliances they already own. Adequate wiring is the answer to one of the electrical industry's major problems, and new methods of wiring* make it an easy and inexpensive job to modernize the wiring of any home. This means additional profits for wiring contractors, and additional sales for electrical dealers. For maximum profits, make adequate home wiring a major talking point in 1940.

** Complete information on request.*

PACIFIC COAST ELECTRICAL BUREAU

601 WEST 5TH STREET LOS ANGELES • 447 SUTTER STREET SAN FRANCISCO

CERTIFIED ADEQUATE WIRING

3—40